

PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM USING OBJECT-  
ORIENTED APPROACH

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## **Abstract**

Islamic asset management system has been implemented over the past few years, but there is no system that combines all types of Islamic assets in one single system. The existing system only focused on the management of the specific asset. In our country, there is only one web-based system for zakat management, whereas the other asset management like fidiah, waqaf and heritage only as a stand-alone system. This will lead to waste of time and effort for users where they have to go to various places to manage their assets. Personal Islamic Asset Management System using Object-oriented approach is a portal that integrates the personal management of Islamic assets which intend to solve all of aforementioned problems. It has detailed information about Islamic asset management including various functions for zakat, heritage, fidiah and kifayah. The Personal Islamic Asset Management System using object-oriented approach also provides the counter information and archived engine to search for related documents. This thesis contributes to the management of personal Islamic assets as well as using object-oriented software engineering. The research methods used are literature review and interviews. The literature review was undertaken to have further understanding of the research problem in order to design the system using object-oriented software engineering approach. The interviews were undertaken to add other requirements for Personal Islamic Asset Management System using Object-oriented Approach. The Personal Islamic Asset Management System using Object-oriented Approach is developed using Rational Unified Process (RUP) model and is being implemented using PHP language and MySQL database for the web environment. Usability test and software metrics measurement were done to ensure the system's usability and system's metrics in terms of reusability and complexity.

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## LIST OF ACRONYMS

RUP:	Rational Unified Process
RUPP:	Rational Unified Process Product
UML:	Unified Modeling Language
PHP:	PHP Hypertext Preprocessor
MySQL:	My Structure Query Language
EPF:	Employee Provident Fund
OOSE:	Object-Oriented Software Engineering
OMT:	Object Modeling Techniques
MAIS:	Majlis Agama Islam Selangor
PZS:	Pusat Zakat Selangor

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# Chapter 1

## Statement of Problem

### 1.1 Introduction

Recently, systems related to Islamic asset management exists in Malaysia but they only focuses on specific category and does not cater all types of Islamic assets. For example, the zakat system or e-zakat which is being implemented by Pusat Zakat Selangor only focuses on zakat and *fidyah*[7], Amanah Raya Berhad has a system to manage the distribution of *harta pusaka*[8], faraid system that is developed by *Universiti Sains Malaysia* only focused on the distribution of heritage using faraid law[3] and Jabatan Agama Islam has a system to manage all the funds and *harta wakaf*[13]. Of all the systems mentioned above, only Pusat Zakat Selangor has the interactive and informative web-based system, whereas the rest are only internal closed systems.

Moreover, most of the existing system using *Bahasa Melayu*, which is cannot be understood globally. The example of the systems that is using *Bahasa Melayu* are e-zakat by *Pusat Zakat Selangor*[7], faraid system by *University Sains Malaysia*[3] and the system that manages funds and *harta waqaf* by *Jabatan Agama Islam*[13].

The problems or weaknesses of these systems faced are as follows:

- These systems are stand-alone system, which is separated according to the organization that handles it.
- The users have to go to different sites if they want to browse different type of asset.
- Only the e-zakat is an interactive and informative web base system but it only manages zakat and fidyah.
- The closed systems which handle *harta pusaka*, *wakaf* and funds only can be accessed by the workers of the organizations. The public can only get the information from the officer, pamphlet or related books.
- The language used is *Bahasa Melayu*, which cannot be understood globally.

To overcome these problems, a system that has the information about all types of Islamic asset management should be implemented. This system must be interactive and attractive as well as informative to attract users. This system must also be web-based so that it can be easily accessible via Internet anywhere and anytime. The system will be applicable to asset managers, professionals and also normal user who are interested with the Islamic asset management. English language has been chose as the language to make the system globally understood. In addition, it will help our new brothers and sisters to have a better understanding of the Islamic asset management system.

The completed system will make the good impact to the Islamic asset managers and other related parties in making their job simple, more productive, more efficient and more effective. All the organizations that handle the Islamic asset management can use the system. The related organizations are *Pusat Zakat*, *Jabatan Agama Islam*, *Amanah Raya* and *Pejabat Tanah dan Daerah*.



Object-oriented technique is the most suitable approach because it presents the real world situation. The existing systems were not using object-oriented approach, so it is one of the reasons why the existing systems are isolated. Object-oriented approach is the right technique to develop the Personal Islamic Asset Management System because it focused on concept of reuse, quality, iterative development and risk management [39].

Personal Islamic Asset Management System using Object-oriented Approach is a system that can manage the flow of Islamic asset. The system will consist of:

- System Database – Store all the information about the Islamic Asset Management System according to its category. The required data can be retrieved from the database.
- System Archive – Store all the data, which the cases have been closed. The function of system archive is as a reference.
- System Information – Display all the information about Islamic Asset Management System in detail.
- System Calculator – Calculate the asset according to its formula. The formula will be different for different asset.
- System Counter – The system is capable to display the detail information about the Islamic asset counter sort by the state.
- Kifayah Limit – The system is able to calculate the receiver limit, whether they are applicable to receive zakat and fidiah. In kifayah limit there is the calculation to decide either the receiver is *maskeen* or *fuqaraa*'.

## 1.2 Scope of Research

The scope for the Personal Islamic Asset Management System using Object-oriented Approach Project is as below:

- The research only limits to the Klang Valley.
- The research assets are *zakat, harta pusaka, wakaf and fidyah.*
- The research will be done at *Majlis Agama Islam Selangor and Pusat Zakat Selangor.*
- The research will exclude Islamic banking.
- The final product of the project will be the complete system.

## 1.3 Objective of the Study

The objectives of the study are as follows:

- To identify sources of Islamic asset and procedure of managing them.
- To develop an object-oriented implementation model in managing the asset in Islamic way.
- To develop a system for managing personal Islamic asset and identify the proper channel of distribution.
- To evaluate the system usability and system metrics.

## 1.4 Research Question

The research questions of the study are as follows:

- a) What are the sources that will be considered as asset in Islam and what is the procedure to manage them?
- b) How to manage assets in an Islamic way using object-oriented model?
- c) What are the proper channel in distributing and receiving the Islamic asset?
- d) How is the reusability and complexity of the system?

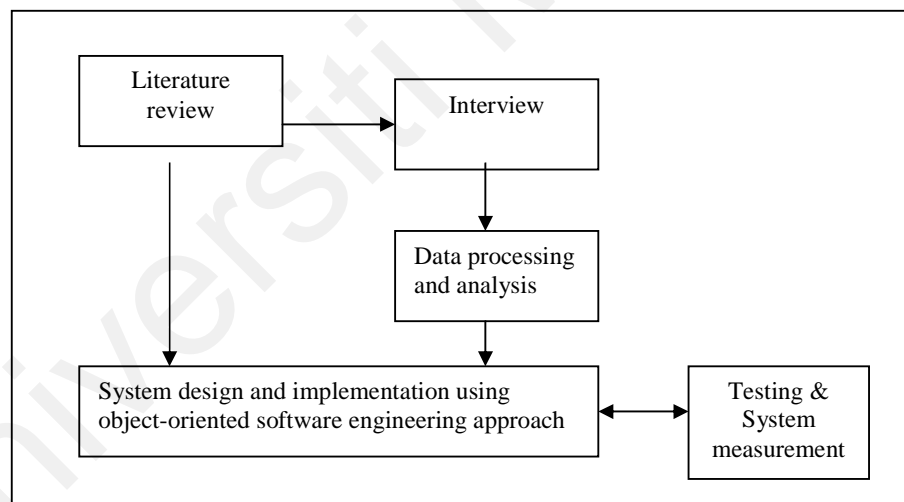
## 1.5 Research Method

Various research methods were used in this study. First, a literature review was used to identify the sources of Islamic asset, Islamic asset management, conventional asset management, conventional asset management system, Islamic asset management system, object-oriented software engineering concept, Rational Unified Process (RUP) and object-oriented software engineering development activities. The researcher explores and makes comparison on the existing systems that is related to Personal Islamic Asset Management System using Object-oriented Approach. The researcher also stresses out the strengths and weaknesses of the existing system in order to come out with a better system. Other than that, the researcher also reviews about object-oriented software engineering in order to develop a system using object-oriented approach.

Secondly, interviews were conducted to collect data, which involve question and answer sessions with selected respondents. All these findings from the literature review were

used to prepare the interview questions. An interview can be conducted in person or by phone. After the interview, the researcher processes and analyses the data in identifying the correct procedure of Personal Islamic Asset Management System using Object-oriented Approach, which, cannot be collected from literature review alone.

The results for the literature review and the interviews were used to develop the Personal Islamic Asset Management System using Object-oriented Approach. In developing the system, a Rational Unified Process (RUP) model was designed as a guideline. Finally, the system has been tested using usability test and was measured using object-oriented metrics. The whole process is depicted in figure 1.1.



**Figure 1.1:** System development process model

## 1.6 Definition of Terms

### 1. Personal

Personal is concerning or affecting a particular person on his or her private business, interests, or activities.

### 2. Object.

Object is a variable comprising both routines and data that is treated as a discrete entity. An object is based on a specific model, where a client using an object's services gains access to the object's data through an interface consisting of a set of methods or related functions. The client can then call these methods to perform operations.

### 3. Object-oriented

Object-oriented software is all about objects. An object receives and sends messages. An object actually contains code (sequences of computer instructions) and data (information which the instructions operate on). Traditionally, code and data have been kept apart.

For example, in the C language, units of code are called functions, while units of data are called structures. Functions and structures are not formally connected in C.

A C function can operate on more than one type of structure, and more than one function can operate on the same structure. Not so for object-oriented software! In o-o (object-oriented) programming, code and data are merged into a single indivisible thing -- an object. A primary rule of object-oriented programming is this; the user of an object should never need to peek inside the object.

#### 4. Object-oriented Software Engineering

Object-oriented software engineering (OOSE) is a software design technique used for software design in object-oriented programming.

#### 5. Object-oriented Approach

Object-oriented approach is the approach used for software development in object-oriented programming.

#### 6. Software

Software means the instructions executed by a computer. Software comes in two main types - system software and application programs. System software is any software that supports the production or execution of application programs but which is not specific to any particular application. Application programs include word-processing packages, multimedia authoring packages and etc.

#### 7. Software Engineering

Software Engineering is an engineering discipline which is concerned with all aspects of software production from the early stages of system specification through to maintaining the system after it has gone into use.

#### 8. Asset

Asset is any item of economic value owned by an individual or corporation, especially that which could be converted to cash. Examples are cash, securities, accounts receivable, inventory, office equipment, a house, a car, and other property.

On a balance sheet, assets are equal to the sum of liabilities, common stock, preferred stock, and retained earnings.

#### 9. Islamic Asset

Islamic asset is property and items of value owned by a Muslim or Islamic based business.

#### 10. System

Any organized assembly of resources and procedures united and regulated by interaction.

#### 11. Rational Unified Process (RUP)

The Rational Unified Process (RUP) is an iterative software design method created by the Rational Software Corporation, now a division of IBM. It describes how to deploy software effectively using commercially proven techniques. It is not a rigid process but a process framework or meta-model.

### **1.7 Significance of the Study**

In recent times, most systems are to be computerized, but regarding to the book, titled “*Faraid: Hukum dan Perlaksanaannya*” [1], there is no system that manages all types of Islamic asset like Personal Islamic Asset Management System using Object-oriented Approach has yet implemented in our country. The system can give a lot of benefits to both society and the organization that in charge the Islamic asset management as follows:

- The society can get a clear understanding about Personal Islamic Asset Management System using Object-oriented Approach.
- The system will be more systematic, accurate and efficient.
- The organization can save in manpower.
- The system calculator is provided, to help eliminate human error.
- All the data will be kept in the database, which will save the space, paper and protect the data from missing.
- The system process will be faster and easier.
- The system is modeled and developed using object-oriented software engineering approach where the classes are reusable.

## 1.8 Project Schedule

In this project, a timeline charts or a Gantt chart was generated. Figure 1.2 illustrated the Gantt Chart for Personal Islamic Asset Management System using Object-oriented Approach. There are fifteen tasks within six groups of activities in the system planning schedule. These six groups were system planning, system analysis, system design, system development, system evaluation and system completion.

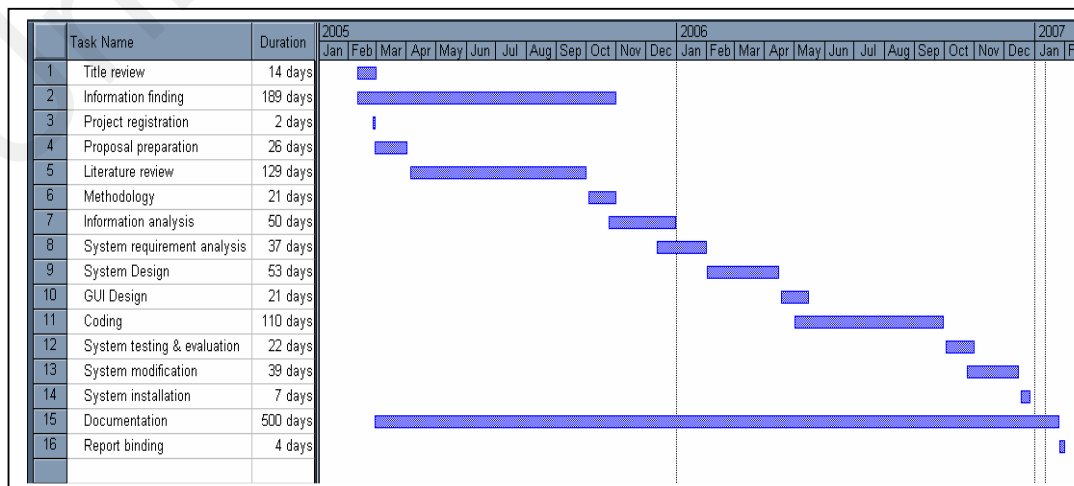


Figure 1.2: Gantt chart



In system planning activities, project review and understanding is important to yet a better understanding of the system. The understanding ensured project development was always in the project scope and on the way to achieve project objectives. In system analysis, collected information was used to design the system. In this stage, interviews were also being conducted. After gathering the information, some analyses were done based on the information collected and interviews conducted. At this level, use case diagrams have been constructed and used as a part of the reference for the system design level.

System design activities, are more focused on system architecture, system process flow and user interface design. Beside this, database used in the system also designed in this level. Class and sequence diagrams were also designed in this level to describe the data flow of the subsystem. The two diagrams were used for system development.

System development or code generating level is an activity that translated what had written or designed in the system design level into machine-readable form or coding. At this stage the real system was developed. System testing is an activity where the system is test by logical test and functional test. Activity in system finish was only begun after the subsystem was fully accomplished. The activities included final testing and installer making.

## **1.9 Thesis Organization**

This thesis is organized into seven related chapters. Chapter 1 focused on the project proposal that cover the scope of research, problem statements, research objective, research problem, research method, significance of the studies and project schedule. It

explained in brief about Personal Islamic Asset Management System using Object-oriented approach.

Chapter 2 literature reviews about asset, Islamic asset, asset management, object-oriented software engineering and object-oriented software engineering development activities. It also includes the comparison of other similar existing systems that is initiated by others. This chapter also discuss about the differentiation between Islamic asset management and conventional asset management. In object-oriented software engineering, this chapter explains about object-oriented software engineering process, Rational Unified Process (RUP), UML and UML diagram types.

Chapter 3 describes about data collection and analysis. This chapter covers the method used in order to gather the information about Personal Islamic Asset Management System using Object-oriented Approach. It elaborates about the sampling and location of the institution, instrumentation, and procedure and data analysis of the research.

Chapter 4 describes about requirement analysis. This chapter covers the analysis about the system requirements in order to develop Personal Islamic Asset Management System using Object-oriented Approach. It elaborates about the functional and non-functional requirements of the system based on the interview and the research on several related web site. Functional requirements explains about what system should do, supported with use case diagram. Non-functional requirements concerns with how well the system perform, software requirements and hardware requirements.

Chapter 5 describes about system design. This chapter covers the detailed design of the Personal Islamic Asset Management System using Object-oriented Approach. It

elaborates about the system design starting from system design and modeling, system functionality, database design up to interface design. The elaboration has been supported by layered architecture, class diagram, sequence diagram and entity relational diagram to illustrate the real system.

Chapter 6 describes the implementation of the system. This chapter covers the implementation process of the Personal Islamic Asset Management System using Object-oriented Approach. Implementation elaborates about the functionality of the system based on classes, methods as well as operators. This chapter also discuss about system environment and output sample.

Chapter 7 describes the evaluation of the system. This chapter covers the evaluation process of the Personal Islamic Asset Management System using Object-oriented Approach. Evaluation elaborates about the usability test and object-oriented metrics measurement of the Personal Islamic Asset Management System using Object-oriented Approach.

Chapter 8 describes the conclusion and future works. It concludes aims achieved, the method used and contributions made by the system. Whereas future works elaborates about how to extend and enhance the system in the future.

## **1.10 Conclusion**

There is a great need to produce a system that can integrate the management of various types of Islamic assets. From the research done, that there is no system that integrates the management of all Islamic assets in a single system. Most of the existing systems just focused on the zakat management itself or heritage management itself. A lot of effort was required in which people need to go to the separate system to manage their asset. Thus, this system is one of the approaches to people them manage their Islamic asset in one portal. In addition, people can access the system from any place, anytime provided there is an Internet connection. The next chapter will give detailed context of the study, which will lead to problem statement identification. It will discuss about types of assets, including Islamic assets, asset management, object-oriented software engineering and object-oriented software engineering development activities in detail.

## **Chapter 2**

### **Literature Review**

#### **2.1 Introduction**

This chapter covers the literature review of asset, Islamic asset, asset management, object-oriented software engineering and object-oriented software engineering development activities. The purpose of literature review is to get more understanding on Personal Islamic Asset management System using Object-oriented Approach. It includes the comparison of other similar existing systems which was initiated by others. This chapter also discusses about the differences between Islamic asset management and conventional asset management.

#### **2.2 Asset**

##### **2.2.1 Definition of Asset**

Asset can be defined as property and items that have commercial value owned by a person or business. The primary classifications of assets are: current assets, long-term assets, prepaid and deferred assets, and intangible assets. [16]

Current assets are cash and other liquid instruments, including accounts receivable that can be converted to cash within one year at maximum. Long-term assets are plants, equipment, real estate and other capital assets, and net of depreciation. Prepaid and deferred assets include expenditures for future costs or expenses, such as insurance, interest or rent, that are set up as assets to be amortized over an applicable period. Intangible assets are assets with a determined value, but which may not be scalable, such as goodwill, patents, copyrights, and brand name recognition.

### 2.2.2 Definition of Islamic Asset

Islamic asset can be defined as:

- Any valuable entity that can be owned or kept by someone such as land, plant, pottery, house and clothes. [22]
- Anything that is not owned or kept by anybody such as animals, tree in the jungle and minerals. [22]
- *Ulama'* defines that Islamic asset as every valuable entity and if anyone destroys it they have to pay the compensation. [22]

*Ulama'* has been divided Islamic asset into four divisions according to the Islamic law as follows [22]:

- Asset that cannot be used is divided into two types which are valuable asset (*mutaqawwim*) and invaluable asset (*ghayr mutaqawwim*).
- Asset that is static and dynamic is known as *'iqar* and *manqul*.
- Asset that have similarities whether in physical or value is known as *mithliy* and asset, which does not have the similarities, is known as *hathliy*.
- Asset that has the static composition is known as *ist'mali* and the asset that does not have static composition is known as *istihlaki*.

### 2.2.3 Types of Islamic Asset

From the Islamic point of view, assets can be classified into valuable assets, invaluable assets, static assets and dynamic assets. Valuable asset is every asset that is kept by someone and *syara'* [20] allow the usage of it. Valuable assets comprise of static and dynamic assets. An invaluable asset is an asset that is, not to be kept by anybody, such as fishes in the sea, birds on the air and minerals inside the earth.

The purposes of dividing asset into valuable and invaluable asset are [20]:

- The valuable asset is valid for all types of business such as hire purchase, hibah, loans as well as set up a company.
- The invaluable asset is not valid for business.
- Those who make any damage on the valuable asset is compulsory to pay its compensate.
- If there is any damage on the invaluable asset it is not compulsory to pay its' compensate.

A static asset is an asset that is cannot be moved from its location like building and houses. A dynamic asset is the asset that can be moved or restructured whether its value or its physical such as money and business properties.

The benefits of dividing assets into static and dynamic, according to the *fiqh* laws are as follows:

- Static assets are controlled under *as-syuf'ah* laws.
- Dynamic assets are controlled under mortgage laws. According to this law, some who need money he/she can sell their property to somebody with promise that he/she will buy back the property that has been sold.

- The trustee of orphans cannot sell the static asset owns by the orphan unless with the excuse which is allow by the *syarak*' such as paying the debts that is important to the orphan but have to get the permission from the judge of *qadhi*.
- Every rights regarding to the neighborhood is only related to the static asset.

### 2.2.3.1 Zakat

From literature point of view, zakat can be defined as bless, virtuous, development and goodness. It is called zakat because it can expand the asset, which its zakat has been paid. According to syara', zakat is a portion of asset that compulsory to be given to the right people. The thorough definition of zakat is the compulsory submitting a portion of the asset to the people who have the right to receive it through *amil* for the God sake [21].

Zakat is the third Islamic Pillar, which had been obligated in the second year of hijrah to the Muslim. At that time zakat payment has been made through basic food based on location like dates and wheat. For our country, zakat payments are made with money or rice, whichever is easier.

There is two types of zakat which is *Zakat Fitrah* and Zakat on properties. Zakat Fitrah means of 'purifying' the act of fasting (which is the fourth pillar of Islam) in the month of Ramadhan as we might have unconsciously committed certain sins while performing the fast. Also, the proceeds will help to lighten the burden of the poor and other needy groups. Zakat Fitrah is compulsory to all Muslims. It is compulsory that the item to be given away as Zakat Fitrah is the staple food of that country. In many countries in Asia, the staple food is rice. Hence, the amount to be given is 1cubic measure which is



equivalent to 2.3 kilograms. For practical purposes, the monetary equivalent of that amount is allowed to be used as Zakat Fitrah.

The payment of Zakat Fitrah can be done from the first day of the month of Ramadan. However, it is encouraged, as it is the Sunnah (practice) of the Prophet of Islam that it be paid on the eve of Shawal (the month following Ramadan) until before the *Eid ul-Fitr* prayers. After this period any payment is considered as charity. As Zakat is an act of worship, it is compulsory to have the conscious intention when performing it.

For the Zakat on Properties, it is compulsory to give Zakat on the following types of property [7]:

- Saving eg: Money in bank's account.
- Income eg: Monthly or yearly income.
- Employee Provident Fund (EPF).
- Gold and Silver.
- Business eg: Yearly profit of the business.
- Share (goods to be traded).

The recipient of zakat are as follows [7]:

- ***The Fuqaraa:*** These people may have money, but it is not sufficient for their basic needs. Others have stated that these people have nothing. Allah says,

*If they are Fuqara (poor), Allah will enrich them out of His Bounty.*

*Surah An-Nur, Ayyah 32*

- **The Maskeen:** These people do not have anything, so they are in need of asking others for food and clothing. Such have the right to ask and receive zakat. Others hold that these are those who may have some their basic needs. Allah says,

*But he has made no effort to pass on the path that is steep. And what will make you know the path that is steep? (It is) freeing a neck (slave), or giving food in a day of hunger to an orphan near of kin, or to a miskeen afflicted with misery.*

*Surah Al-Balad, Ayyah 11-16.*

- **Zakat Collectors:** These are persons that the authority employs to collect the zakat. The authority gives them a fee for their work, which includes, collecting, recording, guarding, dividing and distributing the zakat.
- **Wayfarer:** The wayfarer is the traveler stranded in a foreign land and is in need of money to achieve his objective or return to his own country. This person can receive zakat, if the purpose for traveling were lawful. If the purpose were unlawful, then he should not receive any moneys from zakat because it would help him in his sins. Allah warns us,

*Help one another in righteousness and piety, but do not one another in sins and transgression.*

*Surah Al-Ma'idah, Ayyah 2.*

- **The debtors:** Debtors are those people burdened by debts because of personal needs or social necessity; such as the person who borrows to spend on himself and his family. This person is given zakat if he does not have enough money beyond his basic needs to repay his debt. However, for the one who borrows money for a social necessity; such as spending on an orphan, reconciling

between Muslims, or renovating a mosque or school; then he may be given zakat to repay his debt. This holds true even if he is wealthy according to sound opinion of the jurists.

- ***Attracting hearts:*** Zakat is also to be paid to attract the hearts of those who have been inclined towards Islam or to prevent the harm of non-Muslims residing within the Muslim state. Scholars have agreed that this type of zakat should be considered whenever there is a need for it. We often see people who embrace Islam become detached from their families and are sometimes deprived of a source of income. These people have the right to receive zakat to protect them from harm and to make their faith firm.

#### **2.2.3.2 Fidiah**

Fidiah is a fine for anyone who is not fasting during the month of Ramadan for some reason and fails to substitute it until the next Ramadan. There are several reasons that permit people breaking their fast: [25]

- Mussafir
- Illness
- Weakness and old age
- Unconsciousness
- Insanity
- Menses and nifaas
- Pregnancy
- Breast feeding
- Risk of life

The person who is eligible to receive fidiah is the same as the person who is eligible to receive the zakat.

### 2.2.3.3 Heritage

Heritage can be defined as all the asset has been left by dead person when their death has been proofed. Heritage can be classified into two types that are dynamic and static heritage asset. The heritage asset is categorized based on its value; Small Heritage Asset for below RM600, 000 and Big Heritage Asset for above RM600, 000. Static asset is the unmovable assets likes land, house and building, whereas dynamic assets are the movable asset like money, share, and business properties. The law of heritage asset distribution is known as *Faraid Law* [18].

The heir who is eligible to inherit the heritage asset is categorizes into three groups as follows:

- *Ashabul Furud* is the heirs who inherit the asset based on Faraid's law that is  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{6}$ ,  $\frac{1}{8}$  and  $\frac{2}{3}$ .
- *Asabah Nasabiah* is the heirs who do not inherit the asset as fixed to them but they can take the balance of the asset after the asset has been distributed to *Ashabul Furud*.
- *Dhawil Arham* is the heir who does not in *Ashabul Furud* or *Asabah Nasabiah* group.

The heir is eligible to inherit the asset are both male and female. There are ten categories of male who can inherit the heritage asset based on hereditary and marriage:

- Son
- Grandson and below.

- Father.
- Grandfather (from father side) and above.
- Siblings.
- Nephew.
- Uncle (from father side)
- Husband
- Male cousin (from father side)
- Men who release the slave.

The categories of female who can inherit the heritage asset based on hereditary and marriage is as follows:

- Daughter.
- Granddaughter and below.
- Mother.
- Grandmother and above.
- Female siblings.
- Wife or wives.
- Women who release the slave.

From Islamic point of view, it is compulsory to divide the heritage asset to its heir evenly. This law is clearly stated in Al-Qur'an and has been fixed by syara' and cannot be changed by the people easily.

#### 2.2.3.4 Waqaf

Waqaf means the donation of personal property to public. One of the ways to upgrade our worship to Allah is by donating a portion of our properties for the God sake. This is because Waqaf is the specialty given to us by Allah, which is not be given to the previous nation. Islam encourages people to use their property for the good reasons [13].

*You shall never attain good unless you spend your favorite things; and Allah knows whatever you spend.*

*Surah Ali-Imran, Ayyah 92.*

Waqaf is not just a donation but it will benefit the person who donates as well as the community. The merit of waqaf is continuous as long as the item is still can be used. Because of the merit of waqaf is special and continuous, Syara' put several rules to the waqaf properties [12].

- The property must be profitable.
- The property must have the long-term benefit.
- The property is donated for specific reason.
- Only for the good deeds.
- The property must be 100% owned by the person who wants to make the donation.

## **2.3 Asset Management**

### **2.3.1 Definition of Asset Management**

Asset Management is a strategic decision-making investment process to enhance productivity and provide alternative solutions for effective utilization of government as well as individual assets. Asset management provides a disciplined approach to cost analysis, a method for analyzing allocation trade-offs between initiatives, tools and information for optimizing returns on investments already made, better and consistent information for reporting to stakeholders like Congress. [26]

### **2.3.2 Conventional Asset Management**

Conventional asset management can be defined as the management of the physical assets of an individual or company in order to maximize return. Typically it is managed through stocks, bonds or cash equivalents. For professional investors, they manage their assets according to specific stated objectives or investment styles.

Asset Management maximizes the performance of fixed, physical or capital assets that have a direct and significant impact on achieving corporate objectives. In conventional asset management, the asset is managed based on the conventional law.

### **2.3.3 Islamic Asset Management**

Islamic asset management can be defined as a systematic planning and control of a physical resource throughout its life. This may include the specification, design, and construction of the asset, its operation, maintenance and modification while in use, and

its disposal when no longer required. The systematic planning and control of physical resources must follow the Islamic law as stated in Al-Quran and *sunnah*.

From the Islamic point of view, assets are gifts from Allah to the people, so that people have to manage it according to the laws fixed by the *syara'* because the ultimate owner of these assets is Allah s.w.t. However, we have to understand the concept of asset and the way to manage it thoroughly.

*“Have you not seen that Allah has made subservient for you whatever is in the heavens and in the earth and had bestowed upon you in full His graces open and hidden? And among people, there are some who contest about Allah without knowledge and with no wisdom and without a luminous Book.”*

*Surah Luqman, Ayyah 20*

From the ayyah above, it shows that Islam put asset as one of natural needs in human life. To fulfill this, Islam has fixed its system and law which, proved works efficiently. This thesis focuses on four categories of Islamic asset management that is Zakat, Fidiah, heritage and wakaf.

### **2.3.3.1 Zakat**

There are two types of zakat, which are Zakat on Properties and Zakat Fitrah. The way of calculating the Zakat on the Properties is different from one asset to another. The amount of zakat due on these types of wealth is 2.5% of their total values. However, this rate is different for other types of wealth such as agricultural products, livestock and natural resources. For Zakat Fitrah the amount to be given is 1 cubic measure that is equivalent to 2.3 kilograms of staple food of that country or the equivalent value of money. Zakat must be distributed among the classes of Muslims for the purposes



enumerated with the intention of fulfilling the obligation of zakat and to whether the recipient has made the absolute owner in his or her sole right of what is given to him or her. The moral this institution conveys is that we must not be selfish and get too fond of worldly possessions, but must always be ready and willing to help our brethren by all means at our disposal.

For example someone has a saving of RM 25000.00 in conventional account with 8% of interest that due for zakat. The total amount of his saving must be minus the bank's interest first, then the balance has to be multiplied by 2.5%. As a result, the zakat amount is 2.5% of the saving after minus the bank's interest.

### **2.3.3.2 Fidiah**

In Malaysia, Fidiah is paid using rice or money. The amount of the rice is about  $\frac{3}{4}$  kilogram per day or equivalent of cash and the amount is accumulated. The amount of rice or money with equivalent value will accumulate until she replaces her fast.

For example someone failed to fast six days during Ramadan, if she failed to replace it until the next Ramadan she has to pay 4.5 kilogram of rice. But if she failed again to replace until next following Ramadan, she has to pay 9 kilogram. If she wants to pay using money, the amount of money is equivalent the value of rice.

### **2.3.3.3 Heritage**

In Malaysia, Amanah Raya Berhad plays its role as the heritage asset administrator. Amanah Raya Berhad will manage all assets including the money in saving account,

employee provident fund (EPF), retirement allowance, compensation and so on. Amanah Raya Berhad also have to identify the heir of the asset, their portion and method of distribution.

The very first step in heritage asset management is to appoint the asset administrator. This will make the process easier and faster. As the asset administrator, Amanah Raya Berhad have the power to manage the heritage asset based on statutory power. Amanah Raya Berhad will apply an administrative letter from the high court and land department. Amanah Raya Berhad will distribute the assets based on faraid of wills letter. Amanah Raya Berhad bound with the law to make sure that the future of the heir is safe and guaranteed. Besides that, Amanah Raya Berhad also has other services like will writing, will keeping as well as will implementation. Wills are important law documents to assure the distribution of heritage asset.

For example, if someone died and left 1 wife, 2 sons and 1 daughter, the allocation of heritage according to *Faraid's* law is as 2.1 below:

**Table 2.1:** Allocation of heritage based on *Faraid's* law.

Heir	Heritage Allocation
Wife	1/8
Son	Two portions from the remaining asset
Daughter	One portion from the remaining asset

#### **2.3.3.4 Waqaf**

Waqaf has been implemented by the Prophet Mohammad p.b.u.h. and his companions. The Waqaf properties have been used to build the mosque and Islamic school. Nowadays, in Malaysia, *Jabatan Agama Islam* controls the waqaf properties. In Islam, Waqaf has the high value and is viewed in three dimensions. Firstly, it gives multiple merit to the people who waqaf their property. Secondly, it helps the poor people. Thirdly, it upgrades the image of Islam. In these development era and rapid growth of economic, the Islamic institution like waqaf must be driven to grow together. This proved that Islam is dynamic and progressive, suitable with the recent situation.

#### **2.3.4 Differentiation between Conventional and Islamic Asset Management**

Recently, there are two types of asset management, which are conventional and Islamic asset management. They are different in terms of implementation and rules. Conventional asset management manages asset based on the conventional law but Islamic asset management manages asset based on the *syara'* and rules as stated in *Al-Quran* and *Hadith*. In the conventional method, all types of funds are invested but in the Islamic method it only invest in Islamic fund. The interest rate of conventional asset management is based on the current market but for Islamic the rate is fixed. In conventional, it can make money from money for example interest from credit card. On the other hand, in Islamic asset management it cannot making money from money but must go through on intermediate step of it being used for the purchase goods and services. Conventional allows the predetermined payment above the actual amount of principal and also supports uncertainty, risk and speculation transaction which is prohibited in Islamic asset management.

### **2.3.5 Conventional Asset Management System**

Conventional asset management system is a system that manages asset in conventional way. Conventional asset management systems have evolved from maintenance management systems. Maintenance management systems use work orders for preventive and corrective maintenance, equipment recording and tracking, replacement parts inventory, and maintenance labor scheduling. The goal of asset management is to optimize asset use and manage all maintenance efforts involved in making assets as reliable, accurate, and efficient as possible. Conventional asset management system usually focuses on physical or capital asset such as financial, bond and stocks management.

### **2.3.6 Personal Islamic Asset Management System**

Personal Islamic Asset Management System is a system that manages personal asset based on Islamic rules and *syara'*. The system will process the data entered by the user (eg: asset value to calculate zakat), to enhance productivity and provide alternative solutions for effective utilization of Islamic assets.

Features of Personal Islamic Asset management System is constructed based on *Al-Quran* and *Sunnah*. Some of the features in Personal Islamic Asset Management System are online record, online calculator, online archive and online counter. Online records of the registered user can be retrieved online but it requires user ID and password. Online calculator is used to calculate the zakat, fidiah and heritage amount based on its calculation. Online archives are related articles that can be viewed online.

Online counter is the online directory where user can browse the information of the zakat, fidiah, waqaf and heritage counter.

### **2.3.6.1 Existing Personal Islamic Asset Management System**

The research on the existing system that is related to Personal Islamic Asset Management System has been done. There are several Personal Islamic Asset Management System such as e-zakat, dompetdhuafa , thezakat, ARB and Faraid System.

- e-zakat is a portal that manages zakat in Malaysia [7]. e-zakat is owned by Pusat Zakat Selangor but controlled by Majlis Agama Islam Selangor. Its function is to manage the asset that is related to zakat such as give the information about zakat to public, help user to calculate zakat, distribute zakat and online payment. The portal also provide the service to check payment record online, view online magazine and article. The strength of e-zakat is the information about zakat is conveying to user via internet, the calculator calculate the zakat according to its category efficiently, has secure online payment and online publication. The limitation of this portal is it only focused on zakat and fidiah. e-zakat is the one and only portal that manages zakat in Malaysia.
- dompetdhuafa is a zakat portal that manages zakat in Indonesia [29]. It is one of several portals that manage zakat in Indonesia, but at researcher point of view, dompetdhuafa is the most comprehensive portal compared to others. The main features of dompetdhuafa are it has the efficient online calculator, online frequent ask question, e-community, online financial report and picking zakat services. The strength of dhompemdhuafa portal are it give good information about zakat, which is easy to understand, has interactive calculator and has an

online financial record. The limitation of dompetdhuafa is same as e-zakat, which is it only focused on zakat and fidiah management.

- thezakat is one of zakat portal that manage zakat at United State of America (USA) [14]. thezakat portal is controlled by the Zakat Foundation in USA. The main features of the portal are it has online payment, online calculator, online magazine and article, online testimonial and photo gallery. The strengths of thezakat are it provide the good information that is easy to understand, has the accurate online calculator, has secured online payment and online publication for user reference. The limitation of thezakat is it only focus on the management of zakat.
- ARB is the portal that manages heritage in Malaysia. ARB is owned by Amanah Raya Berhad [8]. The main features of the portal are it has the complete information about heritage, both in Islamic and conventional way, online wills form, online article and online forms. The limitation of ARB is it only focuses on heritage management and it do not have heritage calculator.
- Faraid system is an Islamic portal that manage heritage in Islamic way in Malaysia [3]. The main features of the portal are it has complete information about faraid, how to distribute heritage in Islamic way, list of appropriate heirs, press archive and faraid calculator. The limitation of Faraid system is it only focuses on heritage management not the other assets.

Features are the characteristic of the system or attributes of a system, which may or may not confer a benefit. Strength is the advantage of the system, which will benefit the user whereas limitation is the restriction or principle that limits the extension of something.

Table 2.1 summarizes the features, strengths and limitations of those systems.

**Table 2.2:** List of features, strength, limitations and development method of existing system.

	e-zakat (Malaysia)	dompethuafa (Indonesia)	thezakat (America)	ARB (Malaysia)	Faraid System (Malaysia)
<u>Features</u>					
• Online Record	✓				
• Online Payment	✓		✓		
• Online Calculator	✓	✓	✓		✓
• Online Magazine & Article	✓		✓	✓	✓
• Online Frequent Ask Question	✓	✓		✓	
• E-Community		✓		✓	✓
• Picking zakat services		✓			
• Online financial report					
• Online Testimonial		✓		✓	
• Photo Gallery			✓		
• Online Wills			✓		✓
				✓	

<p><u>Strengths</u></p> <ul style="list-style-type: none"> <li>• Has good information</li> <li>• Has interactive calculator</li> <li>• Has Online payment services</li> <li>• Updated financial report</li> <li>• Online publication</li> <li>• Has picking zakat services</li> </ul>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓</p>
<p><u>Limitations</u></p> <ul style="list-style-type: none"> <li>• Focus on zakat</li> <li>• Focus on fidiah</li> <li>• Focus on heritage</li> <li>• Focus on waqaf</li> </ul>	<p>✓</p> <p>✓</p>	<p>✓</p> <p>✓</p>	<p>✓</p>	<p>✓</p>	<p>✓</p>



As conclusion, the existing system of Asset Management System has its own strength and limitation. All of the system above provides the information about the zakat to give the clear view about zakat to the user. But those systems only focused on zakat and fidiah, not the other Islamic asset. All of the system has an interactive online zakat calculator to help user calculate the amount of zakat they have to pay. e-zakat from Malaysia and thezakat from America provide online payment services and online publication. Whereas, dompetdhuafa from Indonesia has picking zakat services and provide online updated financial report.

The development of Personal Islamic Asset Management System using Object-oriented Approach will be the one stop center for Islamic asset management as it will combine the management of zakat, fidiah, heritage and waqaf in one portal. One of the most appropriate methods of developing the system is object-oriented software engineering.

## **2.4 Object-oriented Software Engineering**

From the research that had been done, researcher found that object-oriented software engineering approach is the best solution to develop Personal Islamic Asset Management System because it focused on concept of reuse, quality, iterative development and risk management [39].

The characteristic of object-oriented software engineering are as follows:

- Provides more realistic representation, which end user can more readily understand.
- Provides consistent approach which maps cleanly onto a physical design and implementation.

- Provides a framework that supports reuse and extensibility.
- Provides more consistent approach to system modeling.
- Provides reuse possibility from the class hierarchy views of the system.
- Able to model user interfaces of a system.

The further explanation of object-oriented software engineering will be in next topic.

#### **2.4.1 Definition of Object-oriented Software Engineering**

Object-oriented Software Engineering (OOSE) is a software design technique used for software design in object-oriented programming. Object-oriented software engineering was developed by Ivar Jacobson circa 1992. It is the first object-oriented design methodology to employ use case to drive software design. It also uses other design products similar to those used by Object Modeling Techniques (OMT) and Unified Modeling Language (UML) [27].

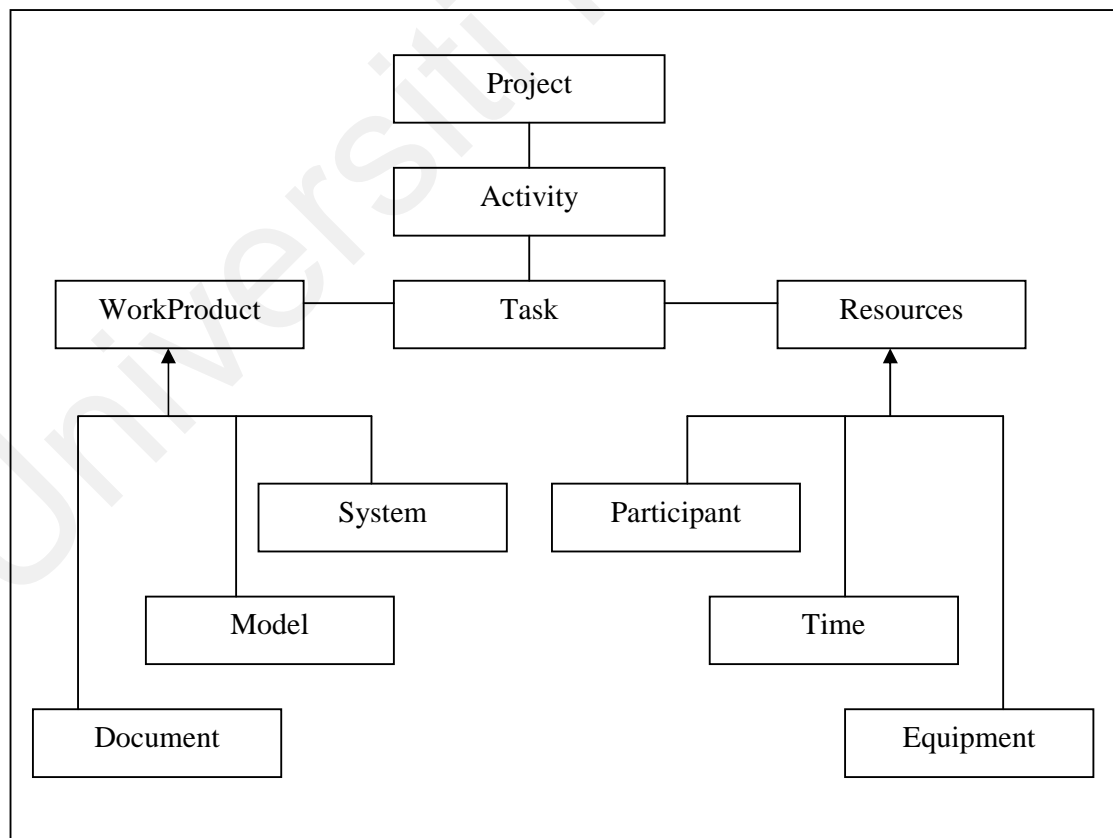
Software engineering is the profession that creates and maintains software applications by applying technologies and practices from computer science, project management, engineering, application domains, and other fields. Software engineering, like traditional engineering disciplines, deals with issues of cost and reliability. Some software applications contain millions of lines of code that are expected to perform properly in the face of changing conditions.

Object-oriented programming is a computer programming paradigm. The idea behind object-oriented programming is that a computer program is composed of a collection of individual units, or *objects*, as opposed to a traditional view in which a program is a list of instructions to the computer. Each object is capable of receiving messages,

processing data, and sending messages to other objects. Object-oriented programming is claimed to give more flexibility, easing changes to programs, and is widely popular in large scale software engineering.

## 2.4.2 Object-oriented Software Engineering Concepts

The concepts of Object-oriented Software Engineering can be described using the main terms and concepts. A project, whose purpose to develop a software system is composed of a number of activities. Each activity is in turn composed of a number of tasks. A task consumes resources and produces a WorkProduct. A WorkProduct can be a system, model or document. Resources are participants, time or equipment. Software engineering concept diagram is shown in figure 2.1.



**Figure 2.1:** Software Engineering Concept [28]

Developing software system requires the collaboration of many people with different background and interest. All the people involved in the project can be referred to as participants. A set of responsibilities in a project or system can be referred as a role. A role is associated with a set of task and is assigned to participant.

System is a collection of interconnected parts. Modeling is a way to deal with complexity by ignoring irrelevant details. Model is referring to any abstraction of the system.

Work product is an artifact that is produced during development such as a document or piece of software for other developer. The work product for internal consumption is known as Internal Work Product. The work product that must be delivered to client is known as Deliverable.

Activity is a set of tasks that is performed toward a specific purpose. Task represents an atomic unit of work that can be managed. Resources are assets that are used to accomplish work. Resources include time, equipment and labor.

### **2.4.3 Rational Unified Process (RUP)**

One of the software engineering lifecycle methodology developed using Object-Oriented Software Engineering (OOSE) methodology is Rational Unified Process (RUP). The Rational Unified Process (RUP) is an iterative software development process created by the Rational Software Corporation. The RUP is not a single concrete prescriptive process, but rather an adaptable process framework. As such, RUP describes how to develop software effectively using proven techniques. While the RUP encompasses a large number of different activities, it is also intended to be tailored, in

the sense of selecting the development processes appropriate to a particular software project or development organization. The RUP is recognized as particularly applicable to larger software development teams working on large projects. Rational Software offers a product known as the Rational Unified Process Product that provides tools and technology for customizing and executing the process.

Rational Unified Process (RUP) begins when the creators and developers of software system focused on diagnosing the characteristics of different failed software projects. They also looked at the existing software engineering processes and their solutions for these symptoms. Project failure is caused by a combination of several symptoms, though each project fails in a unique way. The outcome of their study was a system of software best practices they named the Rational Unified Process. Since knowing these problems will not guarantee a successful software product unless the solutions are also considered, the Rational Unified Process Product (RUPP) was created.

Using the RUP, software product lifecycles are broken into individual development cycles. These cycles are further broken into their main components, called phases. In RUP, these phases are termed as inception, elaboration, construction and transition phase.

#### **2.4.3.1 Inception Phase**

In this phase the business case which includes business context, success factors and financial forecast is established. To complement the business case, a basic use case model, project plan, initial risk assessment and project description are generated. After these are completed, the project is checked against the following criteria:

- Stakeholder concurrence on scope definition and cost/schedule estimates.
- Requirements understanding as evidenced by the fidelity of the primary use cases.
- Credibility of the cost/schedule estimates, priorities, risks, and development process.
- Depth and breadth of any architectural prototype that was developed.
- Actual expenditures versus planned expenditures.

If the project does not pass this phase, it can either be cancelled, or can repeat this phase after being redesigned to better meet the criteria.

#### **2.4.3.2 Elaboration Phase**

The Elaboration phase is where the project starts to take shape. In this phase the problem domain analysis is made and the architecture of the project gets its basic form.

This phase must pass another lifecycle by meeting the following criteria:

- A use-case model in which the use-cases and the actors have been identified and most of the use-case descriptions are developed. The use-case model should be 80% complete.
- A description of the software architecture in a software system development process
- Architecture prototype, which can be executed.
- Business case and risk list which are revised.

- A development plan for the overall project.

If the project cannot pass this milestone, there is still time for it to be cancelled or redesigned. After leaving this phase, the project transitions into a high-risk operation where changes are much more difficult and detrimental when made.

#### **2.4.3.3 Construction Phase**

In this phase the main focus goes to the development of components and other features of the system being developed. This is the phase when the bulk of the coding takes place. This phase produces the first external release of the software.

#### **2.4.3.4 Transition Phase**

In the transition phase the product has moved from the development organization to the end user. The activities of the phase include: Training of the end users and maintainers, Beta testing of the system to validate it against the end users expectations. The product is also checked against the quality level set in the Inception phase. If it does not meet this level, or the standards of the end-users, the entire cycle begins again.

#### **2.4.4 Object-oriented Software Engineering Development Activities**

Development activities deal with the complexity of the system by constructing and validating models of the application domain or the system. Development activities

include requirement elicitation, analysis, system design, object design implementation and testing.

During requirement elicitation, the client and developers define the purpose of the system. The result of this activity is a description of the system in terms of actors and use cases. Actors represent the external entities that interact with the system. Actor includes roles such as end user, other computers the system need to deal with and the environment. Use cases are general sequences of events that describe all possible actions between an actor and the system for given piece of functionality.

During analysis, developers aim to produce a model of the system that is correct, complete, consistent and unambiguous. Developers transform the use cases produced during requirement elicitation into an object model that completely describes the system. During this activity, developers discover ambiguities and inconsistencies in the use case model that they resolve with the client.

During system design, developers define the design goals of the project and decompose the system into smaller subsystems that can be realized by individual teams. Developers also select strategies for building the system, such as the hardware/software platform on which the system will run, the persistent data management strategy, the global control flow, the access control policy and the handling of boundary condition. The result of the system design is a clear description of each of these strategies, subsystem decomposition and deployment diagram representing the hardware/software mapping of the system.



During object design, developers define solution domain objects to bridge the gap between the analysis model and the hardware/software platform defined during system design. This includes precisely describing object and subsystem interfaces, selecting off the shelf components, restructuring the object model to attain design goals and optimizing the object model for performance.

During implementation, developers translate the solution domain model into source code. This includes implementing the attributes and methods of each object and integrating all the objects such that they function as a single system. The implementation activity spans the gap between the detailed object design model and a complete set of source code files that can be compiled.

During testing, developer find differences between the system and its models by executing the system with sample input data sets. During unit testing, developers compare the object design model with each object and subsystem.

#### **2.4.4.1 UML**

Unified Modeling Language (UML) is a non-proprietary, third generation modeling and specification language. However, the use of UML is not restricted to model software. It can be used for modeling hardware (engineering systems) and is commonly used for business process modeling, organizational structure, and systems engineering modeling. The UML is an open method used to specify, visualize, construct, and document the artifacts of an object-oriented software-intensive system under development. The UML represents a compilation of best engineering practices which have proven to be successful in modeling large, complex systems, especially at the architectural level.

UML is a notation that resulted from the unification of Object Modeling Technique (OMT) and object-oriented software engineering (OOSE). The goal of UML is to provide a standard notation that can be used by all object-oriented methods and to select and integrate the best elements of precursor notations.

UML uses the following concepts that are actor, activity, interface, package, class, statechart and event.

An actor is something or someone who supplies a stimulus to the system. It can also be thought of as something the system requires in order to function. In addition to actors there also exists primary actors. Primary Actors interact directly with a system to achieve their goals. Supporting actors may be humans or systems called in to support the Primary Actor.

An activity is a major task captured by a UML software design that must take place in order to fulfill an operation contract. Therefore, an activity can represent the invocation of an operation, a step in a business process, or an entire business process. Activities can be decomposed into sub-activities, until at the bottom where we find atomic Actions.

An interface defines the means of interaction between software components - this includes constants, data types, types of procedures, exception specifications and method signatures. In some instances, it may be useful to define variables as part of the interface.

It often also specifies the functionality of those procedures and methods, either by comments or by formal logical assertions. The concept of interface is the cornerstone of modular programming, a forerunner and a standard ingredient of object-oriented

programming. In object-oriented programming, an object's interface consists of a set of methods that the object will typically respond to.

A package is a collection or grouping of related classes or classes with related functionality. An example of a package is the java.io package which contains or groups together all the classes in the java programming language that aid input and output of data/information, for instance the buffered reader class, which is basically used to accept user input from the keyboard, in the java programming environment.

A class consists of a collection of types of encapsulated instance variables and types of methods, possibly with implementation of those types together with a constructor function that can be used to create objects of the class. A class is a cohesive package that consists of a particular kind of compile-time metadata. A Class describes the rules by which objects behave; these objects are referred to as "instances" of that class. A class specifies the structure of data which each instance contains as well as the methods which manipulate the data of the object; such methods are sometimes described as "behaviour".

Statechart are used to graphically represent finite state machines. State transition tables are another possible representation.

An event is something that takes place; an occurrence and arbitrary point in time. A significant occurrence or happening. A social gathering or activity. Individuals define an event's significance subjectively; people actively and retroactively compartmentalize their lives and history in terms of epochs delimited by events considered to be significant.

## **2.4.4.2 UML Diagram Types**

UML has several diagram types according to its stage, which are use case diagram, class diagram, interaction diagram, collaboration diagram, statechart diagram, activity diagram and deployment diagram.

### **2.4.4.2.1 Use Case Diagram**

Use Cases are used during requirements elicitation and analysis to represent the functionality of the system. Use cases focus on the behavior of the system from an external point of view. A use case describes a function provided by the system that yields a visible result for an actor. An actor describes any entity that interacts with the system. The identification of actors and use cases results in the definition of the boundary of the system, that is, in differentiating the task accomplished by the system and the task accomplished by its environment. The actors are outside the boundary of the system, whereas the use cases are inside the boundary of the system.

### **2.4.4.2.2 Class Diagram**

Class diagrams are used to describe the structure of the system. Classes are abstractions that specify the common structure and behavior of a set of objects. Objects are instances of classes that are created, modified and destroyed during the execution of the system. An object has state that includes the values of its attributes and its links with other objects. Class diagram describe the system in term of objects, classes, attributes, operations and their associations.

#### **2.4.4.2.3 Interaction Diagram**

Interaction diagrams are used to formalize the dynamic behavior of the system and to visualize the communication among objects. They are useful for identifying additional objects that participate in the use cases. Objects that involved in a use case is called participating objects. An interaction diagram represents the interactions that take place among these objects.

#### **2.4.4.2.4 Collaboration Diagram**

A Collaboration diagram models the interactions between objects in terms of sequenced messages. Collaboration diagrams represent a combination of information taken from Class, Sequence, and Use Case Diagrams describing both the static structure and dynamic behavior of a system. Collaboration and sequence diagrams describe similar information, and as typically implemented, can be transformed into one another without difficulty. However, collaboration diagrams use the free-form arrangement of objects and links as used in Object diagrams. In order to maintain the ordering of messages in such a free-form diagram, messages are labeled with a chronological number and placed near the link the message is sent over. Reading a Collaboration diagram involves starting at message 1.0, and following the messages from object to object. In UML 2.0, the Collaboration diagram has been simplified and renamed the Communication diagram.

#### **2.4.4.2.5 Statechart Diagram**

Statechart diagrams describe the dynamic behavior of an individual object as a number of states and transitions between these states. A state represents a particular set of values for

an object. Given a state, a transition represents a future state the object can move to and the conditions associated with the change of state.

#### **2.4.4.2.6 Activity Diagram**

Activity diagrams represent the business and operational workflows of a system. An Activity diagram is a variation of the state diagram where the "states" represent operations, and the transitions represent the activities that happen when the operation is complete. This activity diagram shows the actions that take place when completing a form. The user starts by filling out the form, then it is checked; the result of the check determines if the form has to be filled out again or if the activity is completed.

#### **2.4.4.2.7 Deployment Diagram**

Deployment diagrams serve to model the hardware used in system implementations and the associations between those components. The elements used in deployment diagrams are nodes, components and associations. This deployment diagram shows the hardware used in a small office network. The application server is connected to the database server and the database client is installed on the application server. The workstation is connected to the application server and to a printer.

## 2.5 Conclusion

During the past few years there has been a remarkable evolution in the world of Islamic Asset Management. This chapter focused on the need to develop a Personal Islamic Asset Management System using Object-oriented Approach. It discussed about assets, Islamic assets, asset management, object-oriented software engineering and object-oriented software engineering development activities. The functional requirement of the system is defined through literature review. The interview questions also have been constructed from the literature review. The additional functional requirement of the system will be defined from the interview. By applying the Rational Unified Process (RUP) model in system development, this chapter is in the inception phase of the process where it analyses the depth and breadth of any architectural prototype that was developed by literature review. The next chapter will focus on the data collection and analysis including the data gathering, sampling and analysis.

## **Chapter 3**

### **Data Collection and Analysis**

#### **3.1 Introduction**

Applying the Rational Unified Process (RUP) model, this chapter also falls into inception phase where the requirement understanding process through data collection and analysis has been done. This chapter describes the data collection and analysis, which covers the method used in order to gather the information about Personal Islamic Asset Management System using Object-oriented Approach. It elaborates the sampling and location of the institution, instrumentation, procedure and data analysis of the research.

#### **3.2 Sample and Location of Institution**

The sample for this research is *Pusat Zakat Selangor* and *Majlis Agama Islam Selangor*, which are located at section 20, *Shah Alam, Selangor*. *Pusat Zakat Selangor* and *Majlis Agama Islam Selangor* have been used as a research sample because this thesis focuses on the Personal Islamic Asset Management System using Object-oriented Approach in Klang Valley.



34 volunteers participated in the present research. There were 14 men and 20 women with a mean age of 37.5 years. These peoples were selected based on research target, which is known as purposive sampling. Participants are all staff of *Pusat Zakat Selangor* and *Majlis Agama Islam Selangor* as well as the public who deals with these institutions. Of the 50 peoples approached for interview into the study, 34 agreed, yielding a response rate of 68%.

The people who have been interviewed are 2 Head of Corporate Affairs Unit, 1 Head of ICT, Finance and Admin Unit, 5 programmers of the existing system, 2 system engineer, 10 front desk officer and 14 public participants who deal with the institutions. The participant demographic characteristics are summarized in Table 3.1.

**Table 3.1:** Demographic characteristic of the participants.

No	Characteristic	Number of people	Percentage
1.	<b>Gender:</b>		
	Male	18	53 %
	Female	16	47 %
2.	<b>Status:</b>		
	Single	12	35 %
	Married	20	59 %
	Divorced	2	6 %
3.	<b>Occupation:</b>		
	Professional	25	74 %
	Non-Professional	4	12 %
	Retiree	5	14 %

4.	<b>Age:</b>		
	< 20 years	4	12 %
	20 – 30 years	8	24 %
	31-40 years	12	35 %
	> 40 years	10	29 %

The table above explains the demographic criteria of the participants which are gender, status, occupation and age. 53% of the participants are male whereas the rest 47% are female. The age of participants is varies from 18 years old to 60 years old with mean age of 37.5 years. Most of the participants are married, which is 59%, single 35% and 6% divorcee. Out of 34 participants, 74% of them are professional workers, 12% non-professional and the rest 14% are retiree.

### 3.3 Instrumentations

The interviews were employed to access the participant's feedback about Personal Islamic Asset Management System using Object-oriented Approach during the research program. The interview took two days, one day for each institution. The interviewees are focused to the users and developers of e-zakat system at *Pusat Zakat Selangor* and people who deal with Islamic asset management at *Majlis Agama Islam Selangor*. The interviews scheduled for both institutions were same, where the developers and support staffs have been scheduled on the morning session and the public users who interact with the system have been scheduled in the afternoon session.

The targeted group was presented with the four sets of questions, which is one set for the developers and support staffs at *Pusat Zakat Selangor*, one set for the developers and support staffs at *Majlis Agama Islam Selangor*, one set for the public users who deal with zakat system and another set for the public users who deal with MAIS system. The question for each set is slightly different to suit with the participants' background. The interview questions generally cover demographic, knowledge, experience and opinions. The questions is enclosed in appendix A. These questions were derived from an analysis of e-zakat portal and MAIS system, which is related to Personal Islamic Asset Management System using Object-oriented Approach.

### **3.4 Procedure**

Ethical clearance to conduct the interview was sought and obtained from *Pusat Zakat Selangor*, *Majlis Agama Islam Selangor* and University Malaya. In order to conduct the interview at both institutions, the contact number and address of both institutions have been searched via Internet. At the same time, the verifying letter from University Malaya, which verifies that the researcher is the student of University Malaya has been applied. After have the contact number and address, an application letter to conduct an interview at their institutions have been sent together with the verifying letter from University Malaya.

When these institutions agreed to be interviewed, the appropriate date and time have been set. The front desk officer has approached the public participants who involved in the interview when they deal with them. They were handed a letter from the researcher that contained the invitation to participate in the interview. The people who wish to participate then came to the institutions at the stated time and date. The participant was

then interviewed using the interview schedule described in the earlier section of this chapter.

### **3.5 Questionnaire Design**

The interview question was designed with reference of the participants. For the interview, four sets of questions have been prepared. Each set is for different group of participants. Set 1 is the interview questions to developer and support staff at *Pusat Zakat selangor (PZS)*. Set 2 is the interview questions to developer and support staff at *Majlis Agama Islam Selangor (MAIS)*. Set 3 is the interview questions to public participants who deal with *Pusat Zakat Selangor (PZS)*. Set 4 is the interview questions to public participants who deal with *Majlis Agama Islam Selangor (MAIS)*.

Out of 34 participants, 11 of them have been interviewed using set 1 that contains 20 questions, 9 of them has been interviewed using set 2 that contains 17 questions, 7 of the has been interviewed using set 3 that contains 11 questions and the remaining 7 participants have been interviewed using set 4 that also contains 11 questions.

### **3.6 Data Analysis**

The interview result analysis conducted by the researcher consists of four sets and each set can be divided into three categories.

For set 1 of interview questions, first category that is covers question 1 and question 2 is the demographic question, which is questions about participant personal data. Second

category, which is cover question 3 to question 16, is the knowledge questions. Third category that is covering question 17 to question 19 is the opinion questions.

For set 2 of interview questions, first category that is covers question 1 and question 2 is the demographic question, which is questions about participant personal data. Second category, which is cover question 3 to question 13, is the knowledge questions. Third category that is cover question 14 to question 16 is the opinion questions.

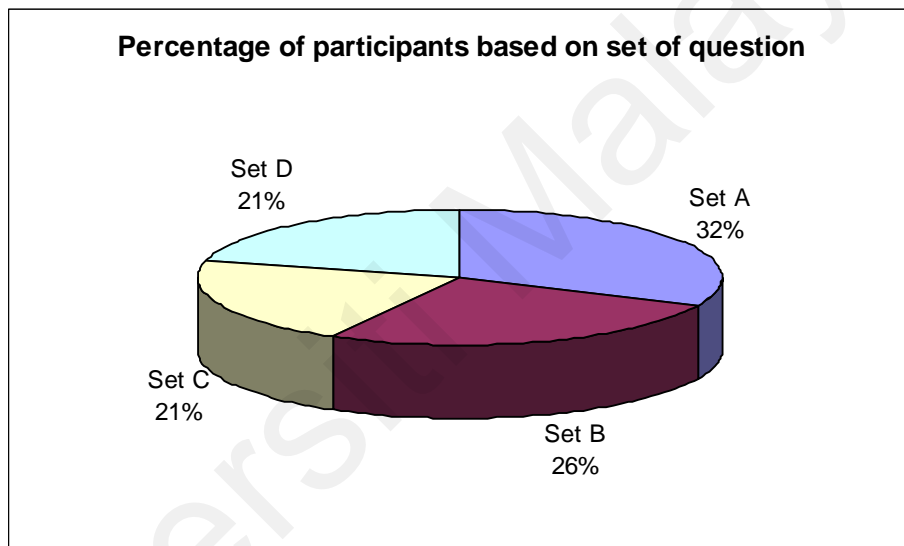
For set 3 and set 4 of interview questions, first category that is covers question 1 to question 3 is the demographic question, which is questions about participant personal data. Second category that covers question 4 and question 5 is the knowledge questions. Third category that is cover question 6 to question 10 is the opinion questions.

From the three categories stated above, the first category is related to the participant personal information. The second category is related the participants' knowledge about the institutions and its existing system. The third category is about the participants' opinions about the existing system and how to improve it.

In conclusion, participants give the good cooperation in order to make the interview succeed. The participants also have a good knowledge about Islamic asset management and give suggestions on how to improve the system. The proposed system is hoped to give the effective, efficient and interactive way in handling Islamic asset.

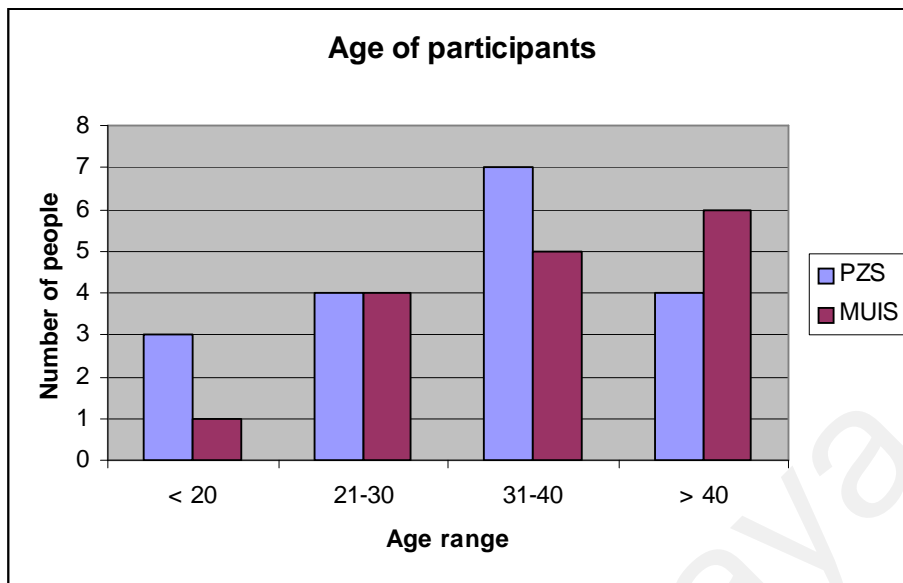
### 3.7 Responses and Graph

From the 34 participants, 11 of them been interviewed using questions from set 1, 9 of them have been interviewed using questions from set 2, 7 of them has been interviewed using questions from set 3 and the another 7 participants has been interviewed using questions from set 4. The percentage of participants based on the different set of questions is illustrated in figure 3.1.



**Figure 3.1:** Percentage of participants based on set of question.

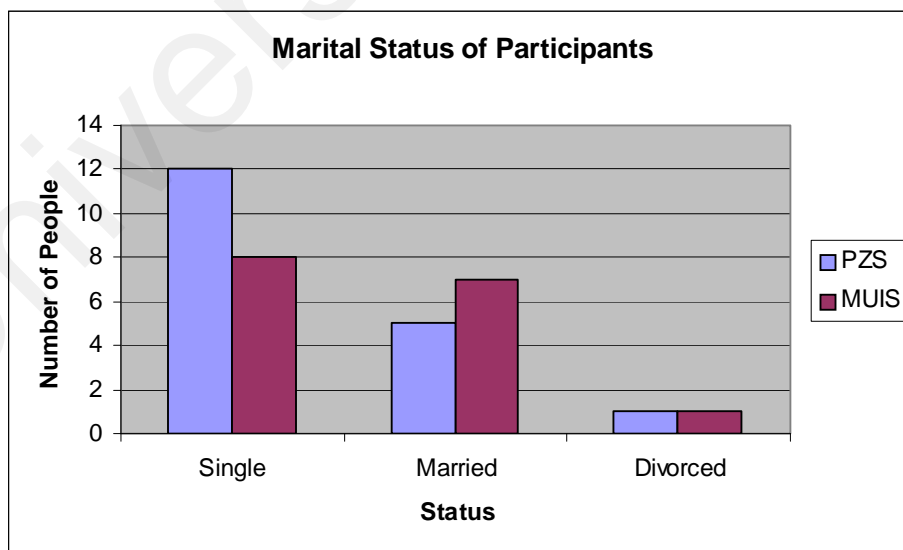
For the interview that has been conducted at *Pusat Zakat Selangor*, the average age of participants is 33 years old whereas the average age for the interview participants at *Majlis Agama Islam Selangor* is 45 years old. Figure 3.2 below shows the age of participants versus number of participants.



**Figure 3.2:** Age of participants

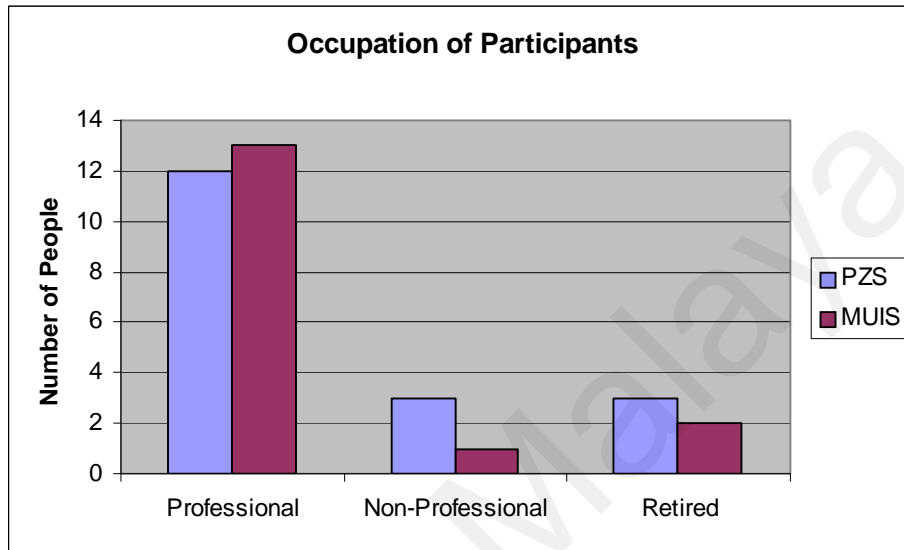
Most of the participants are married with 59%, single 35% and the rest 6% are divorcee.

Figure 3.3 shows the number of participants based on their marital status at *Pusat Zakat Selangor* and *Majlis Agama Islam Selangor*.



**Figure 3.3:** Marital Status of Participants

74% of the interviewees are the professional workers, 12% non-professional and 14% retiree. Figure 3.4 summarizes the number of participant based their occupation at both institutions.



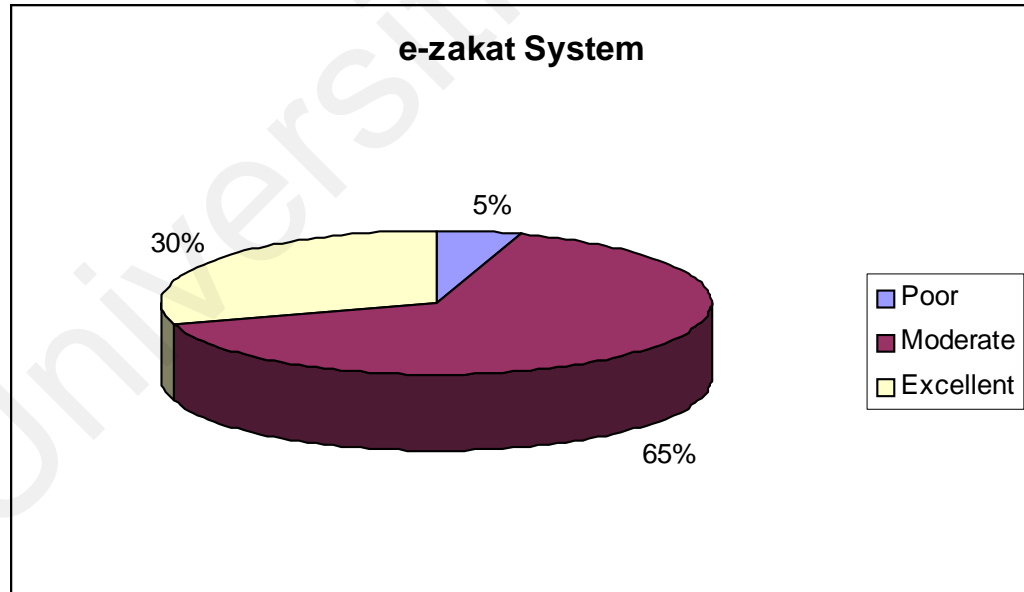
**Figure 3.4:** Occupation of Participants

Most of the *Pusat Zakat Selangor's* staffs gave the good explanation about zakat and the function the institution in order to manage the zakat. They also explain about mission and vision of *Pusat Zakat Selangor* plan to achieve in future. *Pusat Zakat Selangor* not only manages zakat but also fidiah. They have their own calculation on distributing those asset based on Islamic law. The detailed information about e-zakat also has been explained, starting from the system architecture up to system support. They also has the complete documentation for e-zakat system including the zakat and fidiah calculation formula. The e-zakat's archive has been managed properly where they updated the archive's data weekly. The benefits of e-zakat are it can spread the information of zakat and fidiah widely through web and simplify the process of zakat and fidiah management to the community.



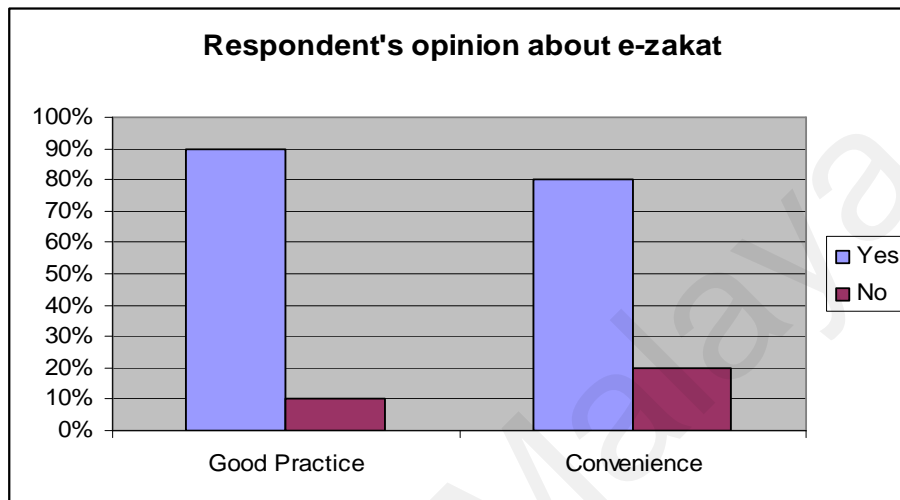
Most of the public that has been interviewed at *Pusat Zakat Selangor* suggest in order to improve the e-zakat system, the system should be in English language as well as *Bahasa Melayu* where user can choose their preferred language. This can make the system can be used globally. The public respondents also proposed the system to be more interactive and user friendly to attract various backgrounds of users. They also agree that e-zakat system simplify the management of zakat and fidiah, which benefits the community.

From the interview done at *Pusat Zakat Selangor* (staffs and public), 5% of the respondent rates e-zakat is a poor, 65% of them rate moderate and the remaining 30% rates excellent for the e-zakat system. Figure 3.5 below illustrates the rating of e-zakat system.



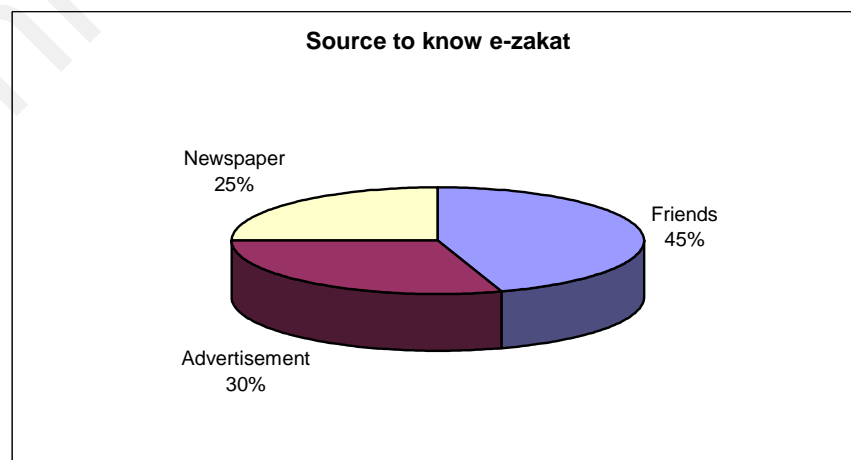
**Figure 3.5:** Rating for e-zakat System

90% said that e-zakat is a good practice in our country. 80% of the participants who deal with Pusat Zakat Selangor convenient with the e-zakat. Figure 3.6 below illustrates the opinion of respondents about e-zakat.



**Figure 3.6:** Respondent's opinion about e-zakat

45 % of the public participant who deals with *Pusat Zakat Selangor* know about the institution from their friends, 30% know from advertisement and another 25% know from newspaper. The data has been illustrated in figure 3.7.



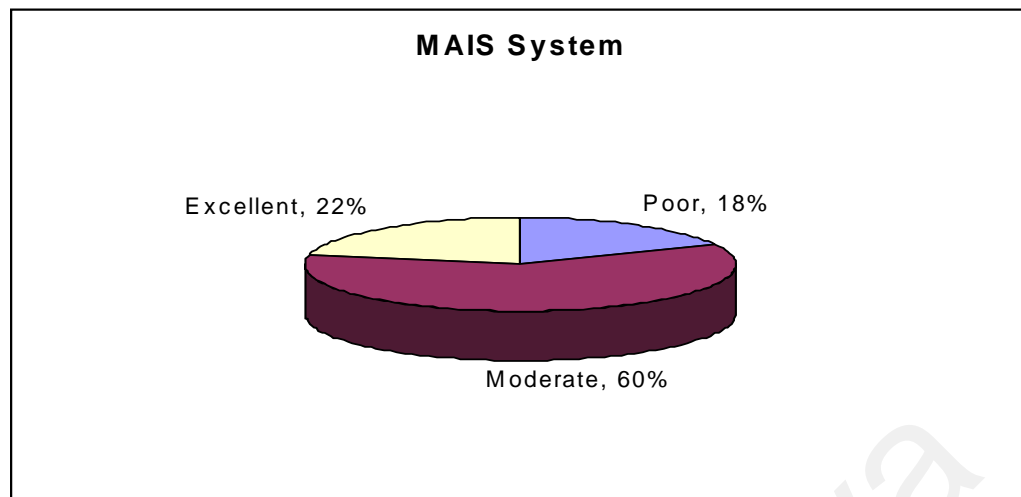
**Figure 3.7:** Source to know e-zakat

Almost all of the *Majlis Agama Islam Selangor's* staffs who have been interviewed gave a good information about their respective institution and its functions in managing the Islamic assets. They also explain about their mission and vision to be achieved in future. *Majlis Agama Islam Selangor* manages all type of assets including zakat, fidiah, heritage and waqaf. They have their own client server system to manage those assets. The detailed information about MAIS system also has been explained, starting from the system architecture up to the system support. They also have the complete documentation for MAIS system including the zakat, fidiah and heritage calculation formula. All the collections is distributed to the needed people according to Islamic law. The MAIS system's archive was not manage properly where they do not update the archive's data for long time. The benefits of having MAIS system is that the staff can do their work faster, aesier and consistent. The system benefits the community by making the process faster and user's data is safely kept in the system database.

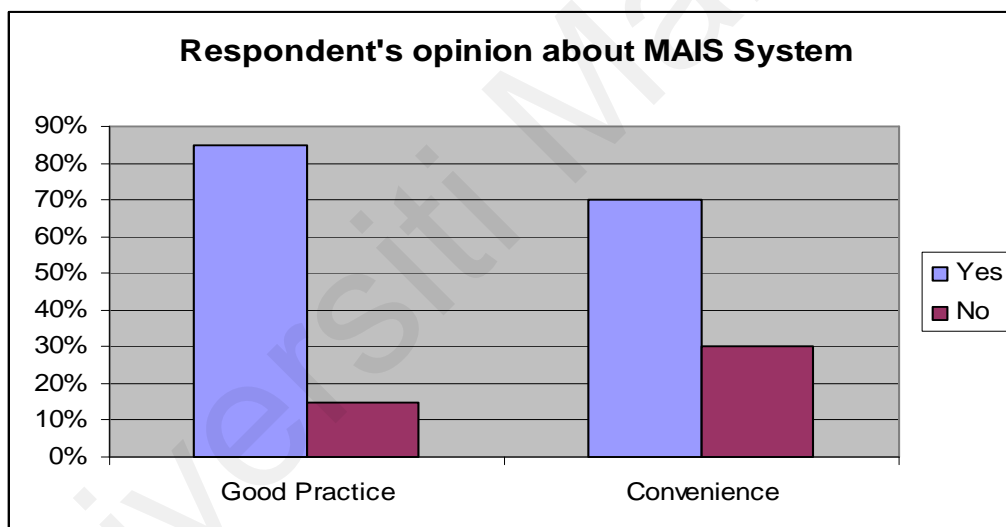
Most of the public that has been interviewed at *Majlis Agama Islam Selangor* suggest in order improving the MAIS system, the system should be web-based. So that user easily can access the system via internet. They also agree that MAIS system can manage zakat, fidiah, heritage and waqaf in consistent way, which benefits the community.

From the interview done at *Majlis Agama Islam Selangor* (staffs and public), 18% of the respondent rates poor, 60% of them rate moderate and the remaining 22% rates excellent for the MAIS system. Figure 3.8 below illustrates the rating of MAIS system.

80% said that MAIS system is a good practice in our country. 70% of the participants who deal with *Majlis Agama Islam Selangor* convenient with the MAIS system. Figure 3.9 below illustrates the opinion of respondents about e-zakat.

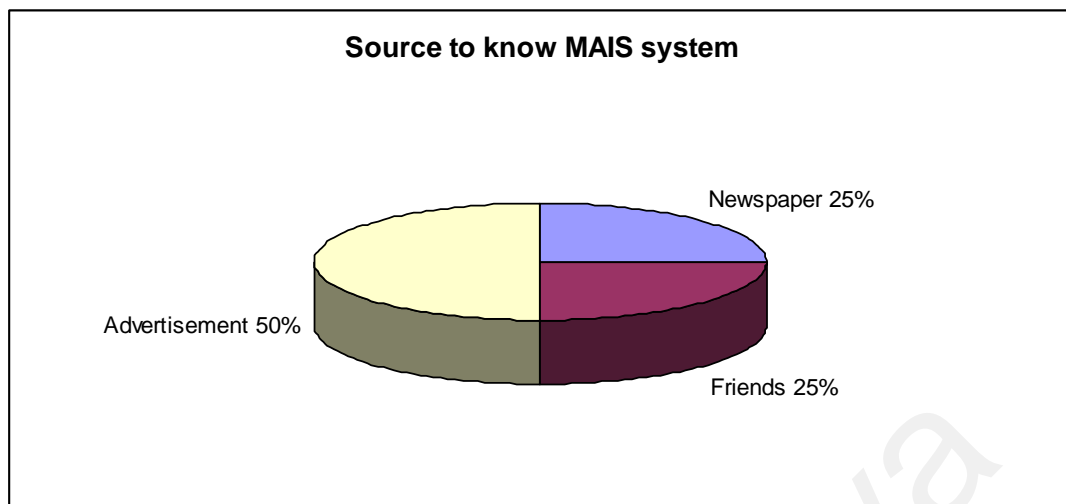


**Figure 3.8:** Rating for MAIS System



**Figure 3.9:** Respondent's opinion about MAIS system

25 % of the public participant who deals with *Majlis Agama Islam Selangor* know about the institution from their friends, 50% know from advertisement and another 25% know from newspaper. Figure 3.10 shows the source where the public know about MAIS system.



**Figure 3.10:** Source to know MAIS system

From the interview that has been done, 94% of the respondents agree to combine zakat, fidiah, heritage and *waqaf* under one asset management system. 74% of the participants have a good knowledge about Islamic asset management. 90% of the respondents say that in order to improve e-zakat and MAIS system, the system must be more attractive, interactive, informative and capable to manage zakat, fidiah, heritage and waqaf in one system.

### **3.8 Discussion on Finding**

It can be summarized that most of the respondents aware about the Islamic asset management like zakat, fidiah, heritage and waqaf and its management system like e-zakat and MAIS system. But, there are limitations in the existing system where the people have to go to many places in order to pay zakat, pay fidiah, manage heritage asset and waqaf asset. Only e-zakat can be accessed through the Internet, the other systems are client server based.

The result of the interview shows that most of them need one platform to handle zakat, fidiah, heritage and *waqaf*, which is reliable, web-based, interactive, informative and user friendly. The platform can be portal or web based system because it can be easily accessed anywhere anytime without boundaries.

### **3.9 Conclusion**

This chapter described about data collection and analysis, which emphasized on sampling and location of institutions, instrumentations, procedures and data analysis. Data analysis details about the analysis of the interview's response, in order to identify the system requirements. The system requirements will be discussed in the next chapter; requirement analysis. Requirement analysis is to analyses the needed requirement in order to develop the system based on object-oriented software engineering techniques.

## **Chapter 4**

### **Requirement Analysis**

#### **4.1 Introduction**

Employing the Rational Unified Process (RUP) model in this chapter maps with the second phase of RUP model which is the elaboration phase. Elaboration phase is where the project started to take shape. In this phase the problem domain analysis has been made and the architecture of the project gets its basic form. It elaborates on the functional and non-functional requirements of the system based on the interview and the literature review in several related web sites. From the functional requirement, the system use case is developed and the actor of the system is identified.

#### **4.2 Functional Requirements**

The functional requirements for this system describe what the system must do. This includes the processes, interface with users and data holds by the system. Following from the analysis that has been done are the functional requirements of the system:

1. The system shall be able to give clear information about the Islamic assets and Islamic assets management.
2. The system shall be able to focus on zakat, fidiah, heritage and waqaf.

3. The system shall be able to make users understand the different types of zakat and heritage.
4. The system shall be able to give the information about zakat and fidiah receiver and identified the person who should receive zakat and fidiah.
5. The system shall be able to help users calculate the zakat based on its type.
6. The system shall be able to let users save and update their zakat calculation.
7. The system shall be able to help users calculate the fidiah.
8. The system shall be able to let the users save and update their fidiah calculation.
9. The system shall be able to help users calculate the heritage based on its scenario.
10. The system shall be able to allow users to save and update their heritage calculation.
11. The system shall be able give the information about payment counter for zakat and fidiah, and also counter for heritage and waqaf.
12. The system shall be able to let the user view the archive record of the Islamic assets as a reference.
13. The system shall be able to differentiate the accessibility to the system between system admin, general user and registered user.
14. The system shall be able to allow system admin to manage users' data. Only admin can add, edit, view and delete the users' data.
15. The system shall be able to allow system admin to manage counter's data. Only admin can add, edit and delete the counter's data.
16. The system shall be able to allow system admin to manage archive. Only admin can add, edit and delete the archive.
17. The system shall be able to let system admin to maintain the database of the system.



18. The system shall be able to provide user ID and password when they register to the system.

19. The system shall be able to allow users to change their password and update personal details.

#### 4.2.1 Use Case Diagram.

The use case diagram represented the functionality of the system from the users' perspective and identified the scope of the system. It is an interaction between the system and its environment. Use case diagram has been used to show the functionality that the system will provide and to show which users to communicate with the system in some way to use that functionality.

For Personal Islamic Asset Management System using Object-oriented Approach, the actor of the use case has been identified based on its requirements. Table 4.1 below shows the actor and its function.

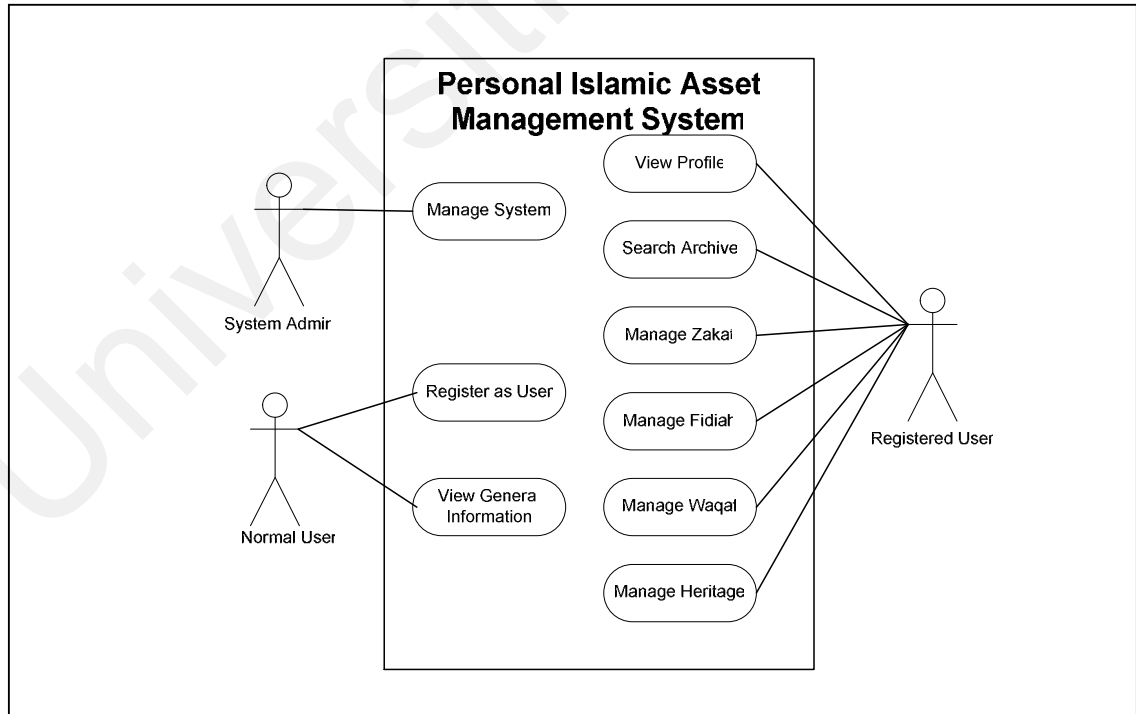
**Table 4.1:** System Actor and description

Actor	Description
System Admin	System admin is the person who manages the Personal Islamic Asset Management System. System admin responsible to all the resourcing issues of the system.
General User	The general user is the public who can access the Personal Islamic Asset Management System. They can only browse the basic information.
Registered User	The registered user is the users who already register as a member to the system. They can use all the features of the system.

The use case diagram for Personal Islamic Asset Management System using Object-oriented Approach has been constructed using three steps in order to make sure that all the features has been included into the use case. It also described in depth on the system functionality. Step 1 is based on the existing system that is related to Personal Islamic Asset Management System using Object-oriented Approach, but after the interview session, it has been detailed out in step 2 and step 3.

**Step 1:**

Figure 4.1 below is the use case for Personal Islamic Asset Management System using Object-oriented Approach and the use case description table for the first iteration is described in table 4.2.



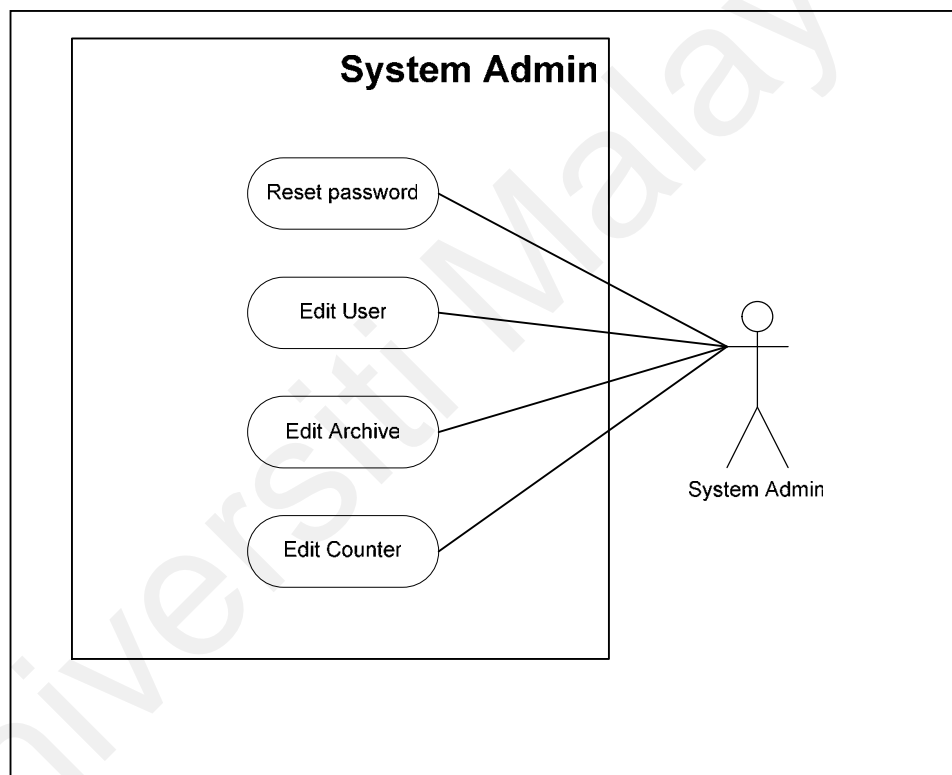
**Figure 4.1:** Personal Islamic Asset Management System using Object-oriented Approach

**Table 4.2:** Personal Islamic Asset Management System using Object-oriented  
Approach Use case description

Use Case	Description
Manage System	Manage all the resources within the system, for instance, maintaining user and the archive data.
Register as User	When a new member joins Personal Islamic Asset Management System using Object-oriented Approach, his or her details are recorded. He or she will be assigned with login ID and password. The default password is 'password' where he or she may change it later.
View General Information	Give the general information about Islamic asset management including kifayah limit and kifayah calculator to the public.
View Profile	Occasionally the member may change their personal data. The old data is retrieved and the new data will be stored.
Manage Zakat	The detail information about zakat including zakat calculator of each categories and information of zakat counter.
Manage Fidiah	The detail information about fidiah including fidiah calculator of each categories and information of fidiah counter.
Manage Heritage	The detail information about heritage including heritage calculator of each categories and information of heritage counter.
Manage Waqaf	The detail information about waqaf including information of waqaf counter.
Search Archive	Registered user may search for the related files at the system archive.

**Step 2:**

In the second step each use case item in iteration 1 is detailed out. Below is the use case and use case description table for the second step. Figure 4.2 is the use case for system admin and its description is described in table 4.3.

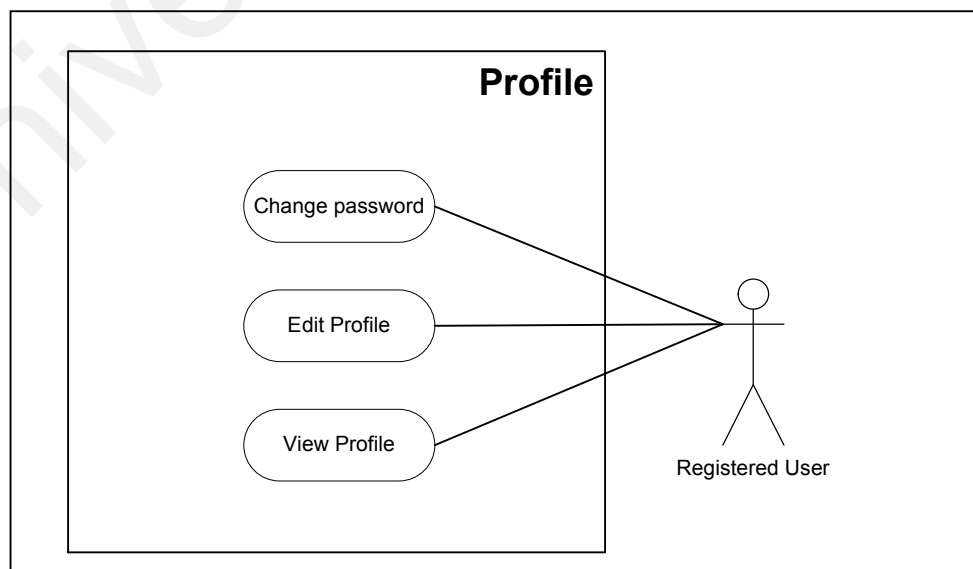


**Figure 4.2:** System Admin Use case

**Table 4.3:** Description of System Admin Use Case

Use Case	Description
Reset Password	Admin can reset the users' password to default if there is any request from the user themselves.
Edit User	The users' data in the system may change, but in case of update only system admin has the access to do the task. System admin can also view the users' detail information.
Edit Archive	Occasionally, the data in the archive has to be updated. The unneeded data will be deleted and the new data will be uploaded.
Edit Counter	If there is a new counter coming up, the information of the counter has to be added in the system. The same goes to any changes of the existing counters' information.

Figure 4.3 is the use case for profile and its description is described in table 4.4.

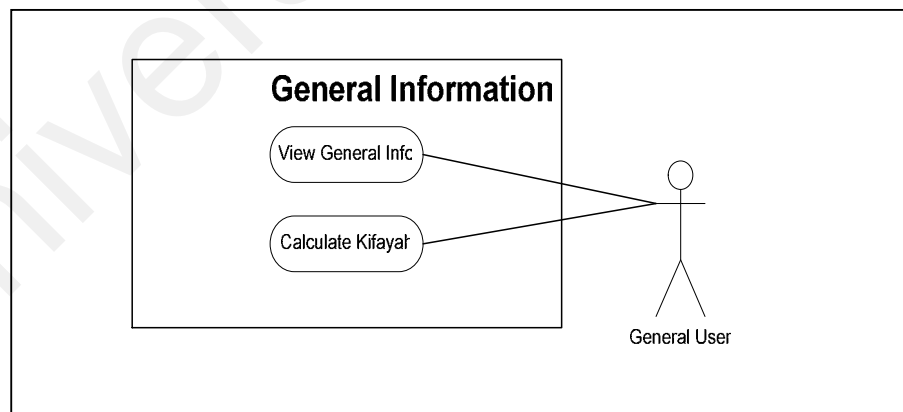


**Figure 4.3:** Profile Use Case

**Table 4.4:** Description of Profile Use Case

Use Case	Description
Change Password	User may want to change their default password for security reason. The new password has to be entered twice and the password will change when the old password is a match with the existing password. New password has to be entered correctly.
Edit Profile	The users' data may change from time to time. The old user's data is retrieve and replace with the new information.
View profile	To allow user to view their profile.

Figure 4.4 is the use case for general information and its function has been described in table 4.5.

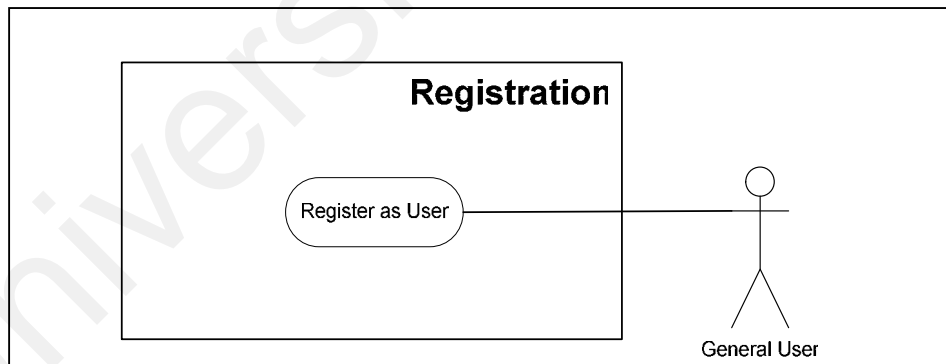


**Figure 4.4:** General Information Use Case

**Table 4.5:** Description of General Information Use Case

Use case	Description
View General Info	Give the brief information about Personal Islamic Asset Management System using Object-oriented Approach by explaining about Islamic asset management, zakat, fidiah, heritage and waqaf in the surface.
Calculate Kifayah	Calculate the kifayah limit by identifying whether the person fall into maskeen or fuqaraa' category that make them applicable to receive fidiah and zakat.

Figure 4.5 is the registration use case and its function has been described in table 4.6.

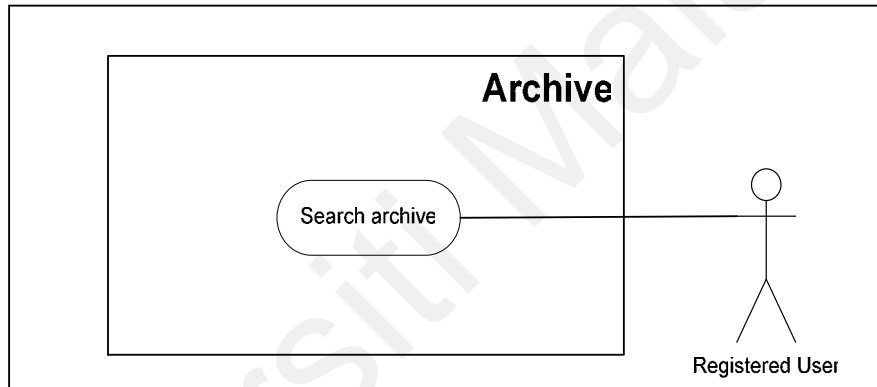


**Figure 4.5:** Registration Use Case

**Table 4.6:** Description of User Registration Use Case

Use case	Description
Register as user	If the user want to use all the features in the system, they need to register by entering all the required information the user will get their username and password via email.

Figure 4.6 below is the archive use case and its function has been described in table 4.7.



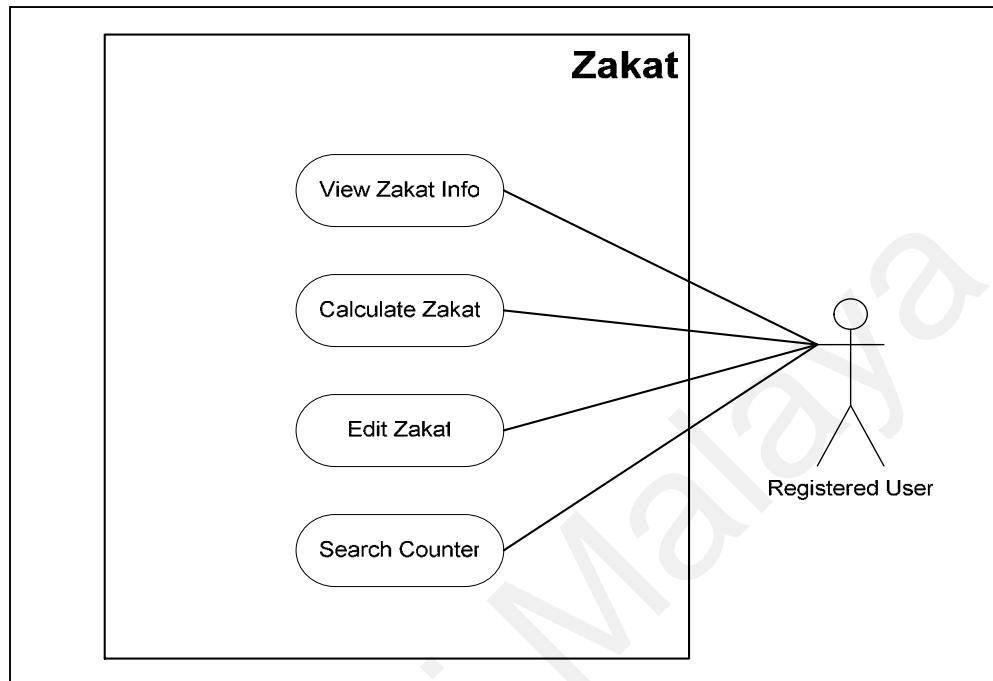
**Figure 4.6:** Archive Use Case

**Table 4.7:** Description of Archive Use Case

Use case	Description
Search Archive	When the user wants to search for document in the archive, they have to enter the keyword and the system will search for it and display the result.



Figure 4.7 below is the use case for zakat and its function has been described in table 4.8.

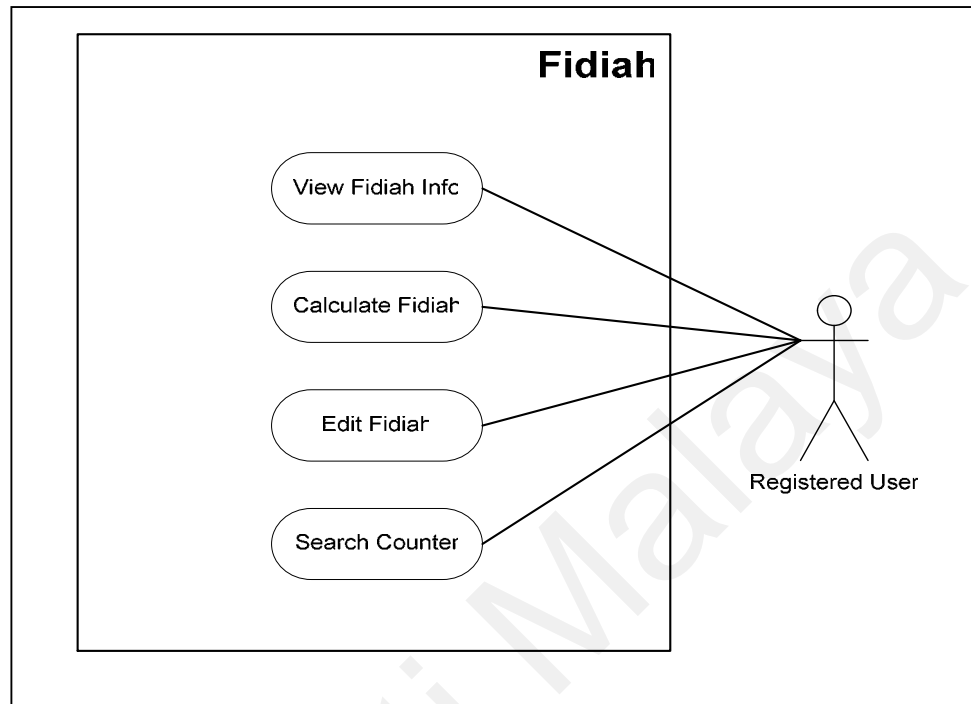


**Figure 4.7:** Zakat Use case

**Table 4.8:** Description of Zakat Use Case

Use case	Description
View Zakat Info	The details information about zakat is explained.
Calculate Zakat	To calculate user's zakat amount. User needs to enter the required information and system will calculate it. It involves calculating the money or asset depending on the zakat type. The zakat value and its status can be saved in the database.
Edit Zakat	When the zakat status is change, it can be updated by retrieving the old data and replacing it with the new data.
Search Counter	The zakat counter can be retrieved by selecting the state.

Figure 4.8 below is the use case for fidiah and its function has been described in table 4.9.

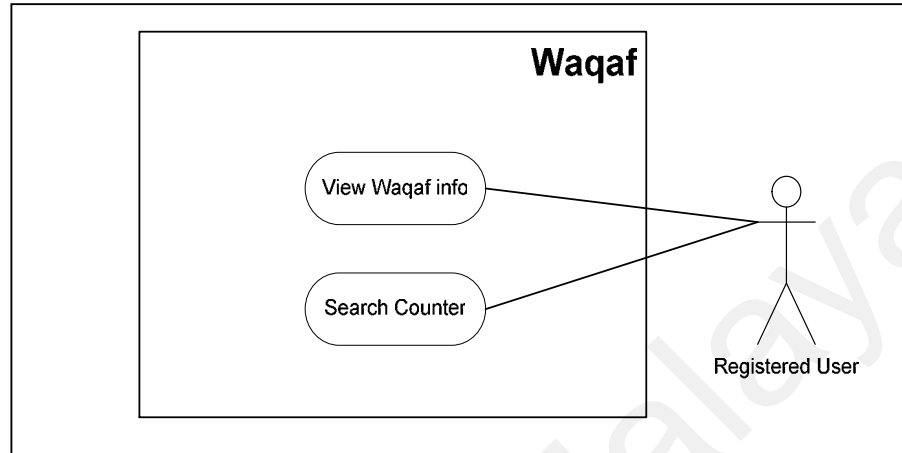


**Figure 4.8:** Fidiah Use case

**Table 4.9:** Description of Fidiah Use Case

Use case	Description
View Fidiah Info	The details information about fidiah is explained.
Calculate Fidiah	To calculate user's fidiah amount. User needs to enter the required information and system will calculate it. It involves calculating of paying fidiah by money and rice. The Fidiah value and its status can be saved in the database.
Edit Fidiah	When the fidiah status is change, it can be updated by retrieving the old data and replacing it with the new data.
Search Counter	The Fidiah counter can be retrieved by selecting the state.

Figure 4.9 below is the use case for waqaf and its function has been described in table 4.10.

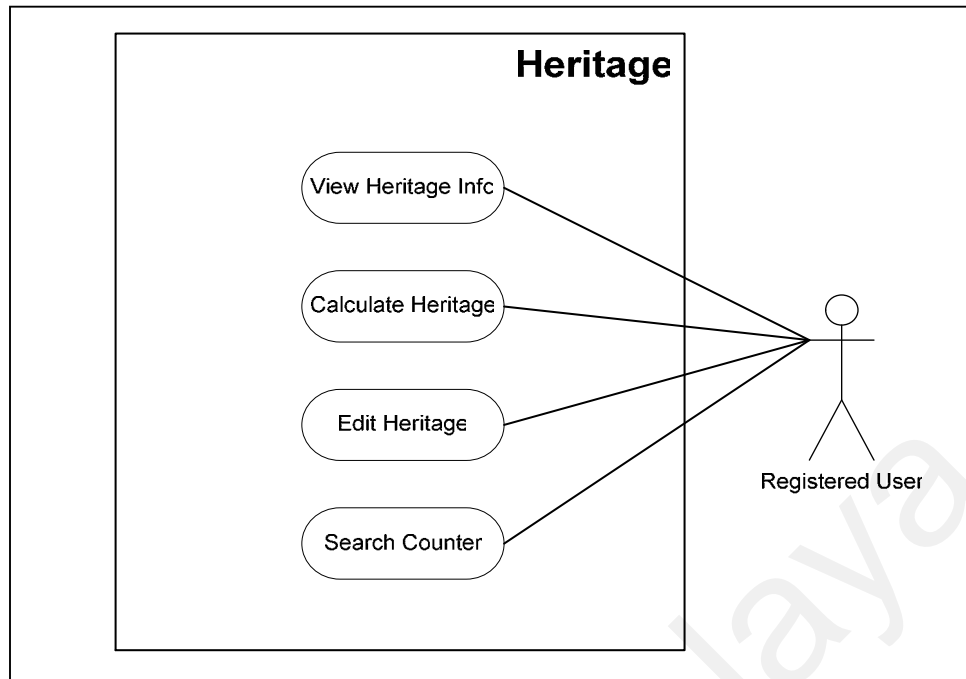


**Figure 4.9:** Waqaf Use Case

**Table 4.10:** Description of waqaf Use Case

Use case	Description
View Waqaf Info	The details information about waqaf is explained.
Search Counter	The waqaf counter can be retrieved by selecting the state.

Figure 4.10 shows the use case for heritage and its function has been described in table 4.11.



**Figure 4.10:** Heritage Use Case

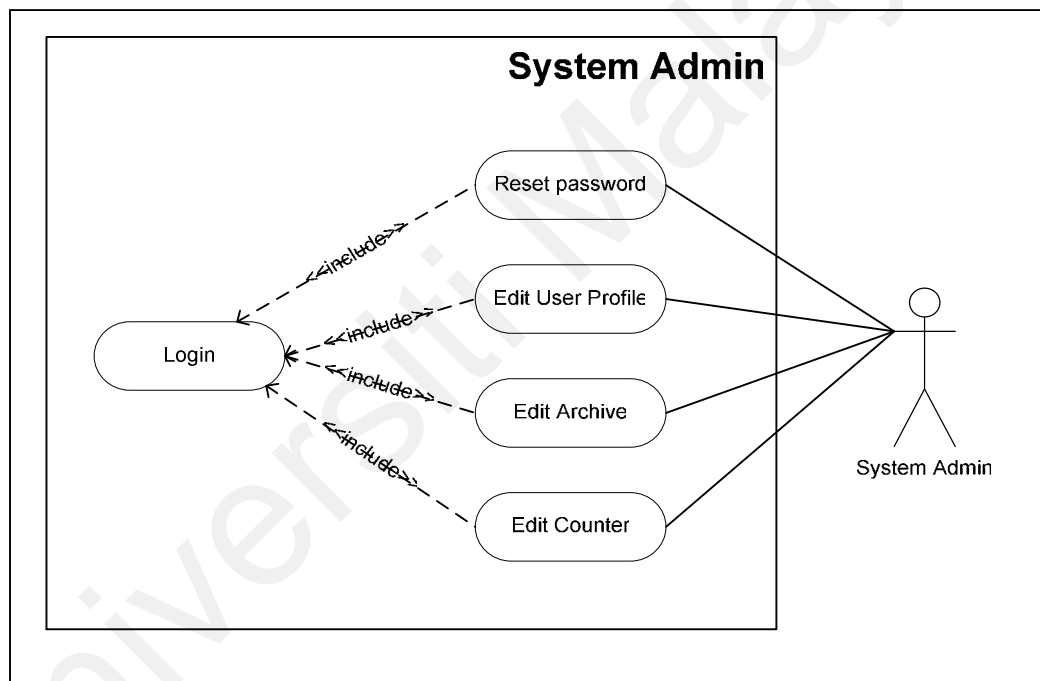
**Table 4.11:** Description of Heritage Use Case

Use case	Description
View Heritage Info	The details information about Heritage is explained.
Calculate Heritage	To calculate user's heritage. User needs to enter the number of heirs and the total heritage amount. The result will be based on the Faraid Law. The amount of heritage for each heir will be saved in the database.
Edit Heritage	When the heritage status is change, it can be updated by retrieving the old data and replacing it with the new data.
Search Counter	The heritage counter can be retrieved by selecting the state.

**Step 3:**

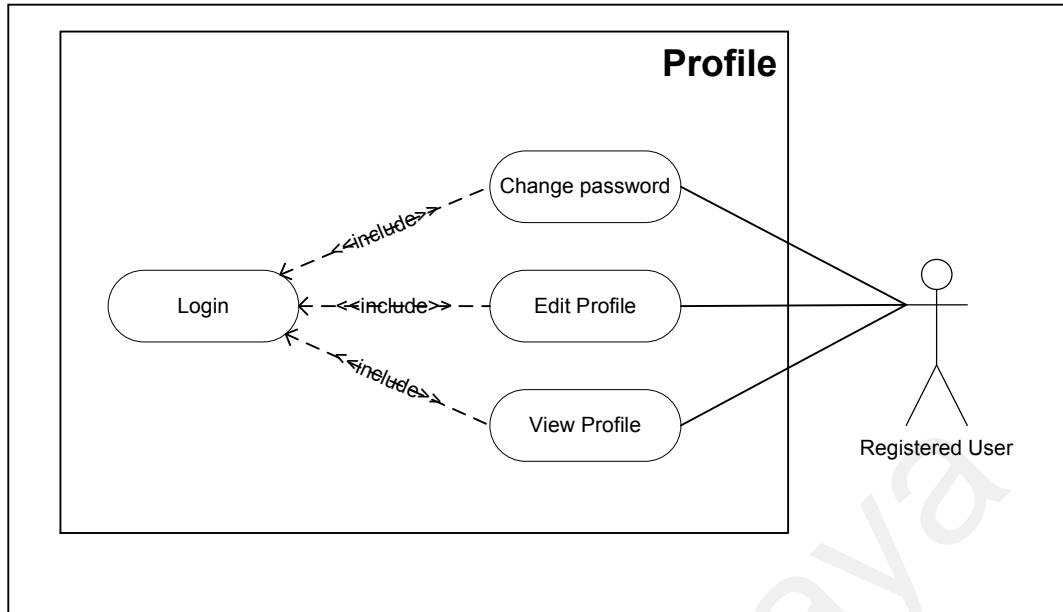
In the third step, the login is included and the printer and calculator is extended to the use case.

In System Admin, login has been included to make sure that only the user with system admin login and password can enter the system. The System Admin use case is as figure 4.11.



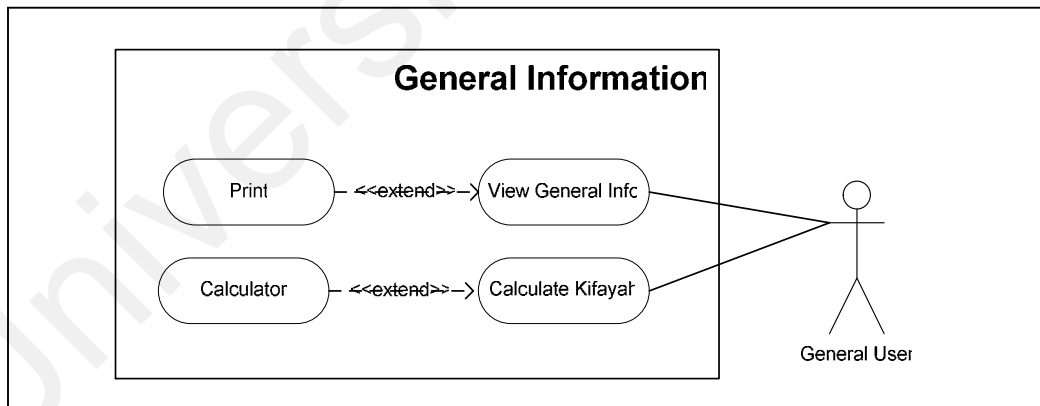
**Figure 4.11:** System Admin Use Case

In Profile, login has been included as well to make sure that the users can only edit their own data. The Profile use case is as figure 4.12.



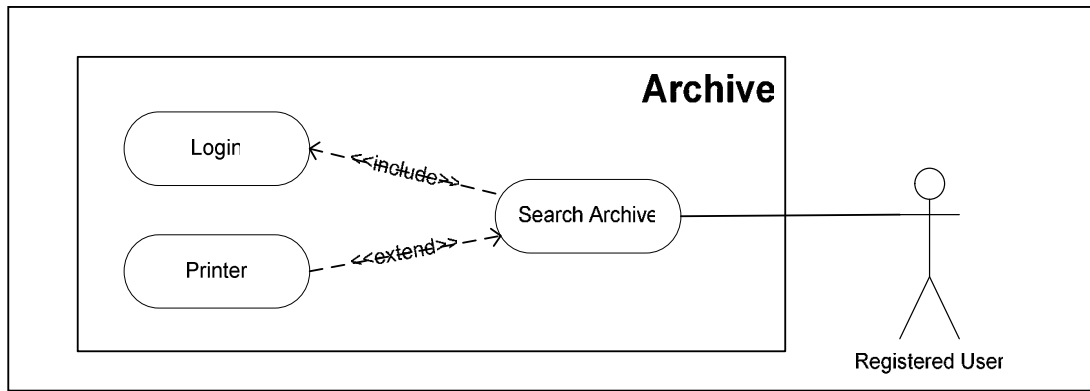
**Figure 4.12:** Profile Use Case

In General Information, it has been extended with the printer to allow user to print the information. The General Information is as figure 4.13:



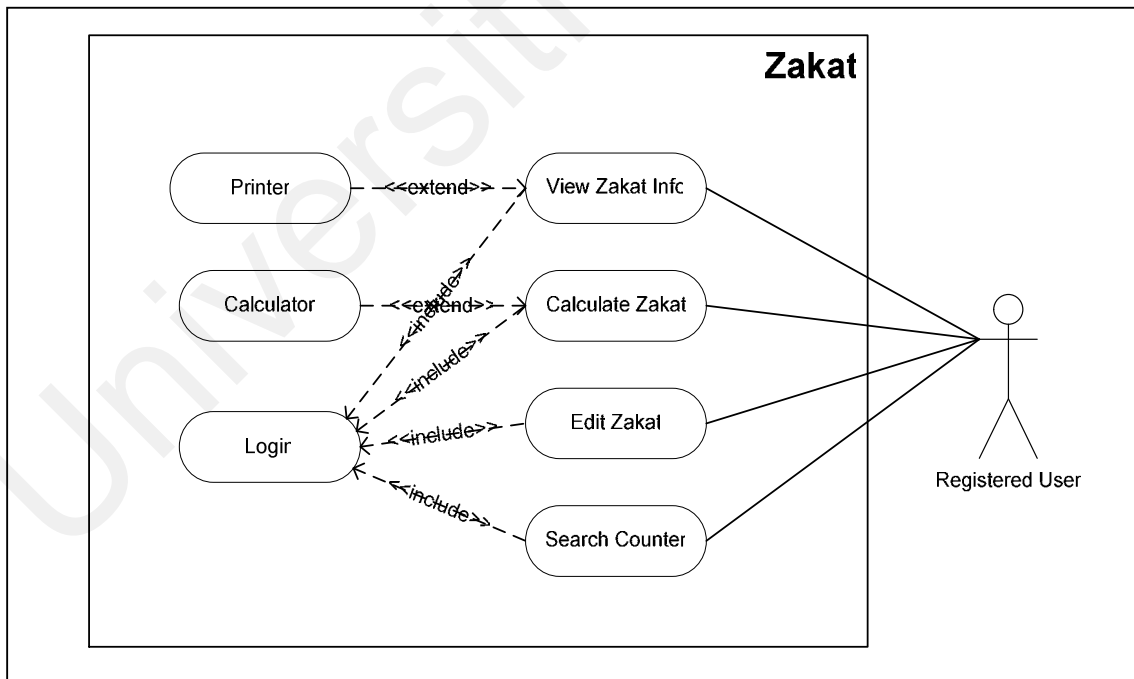
**Figure 4.13:** General Information Use Case

In Archive it has been included with login feature to make sure that only registered users have access to the documents in the archive. Archive has also been extended to the printer to allow users to print the document. Archive use case is as figure 4.14.



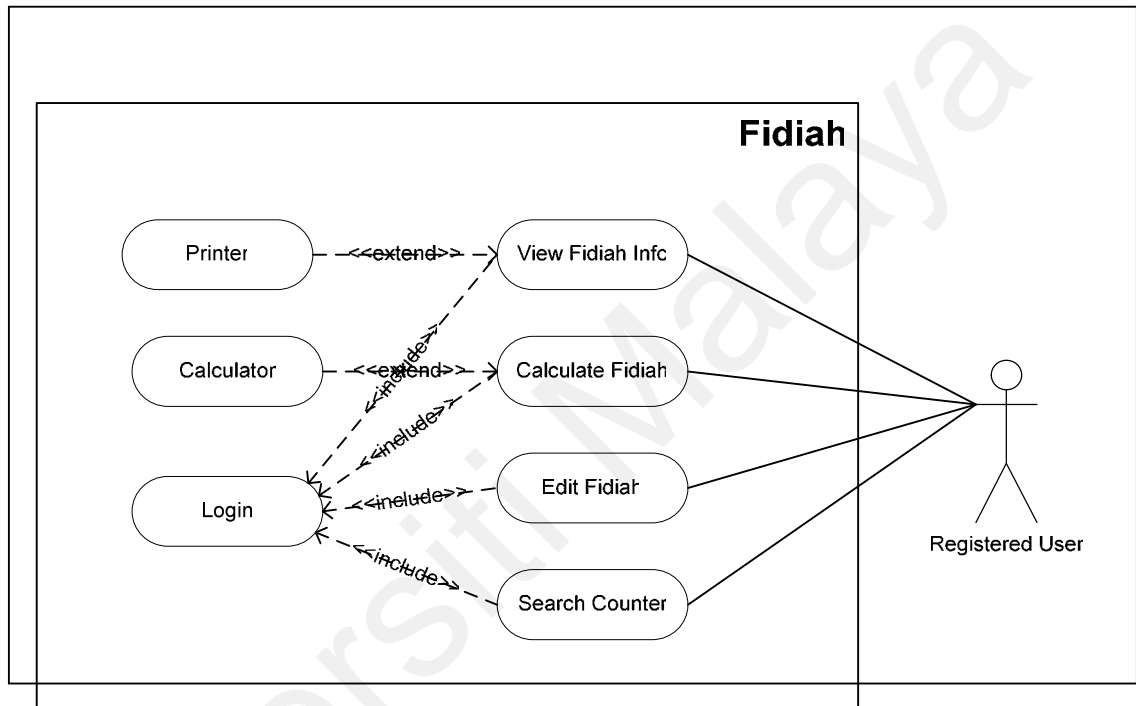
**Figure 4.14:** Archive Use Case

In Zakat, it has been included with login feature to make sure that only registered users have access to the zakat module and use its features. Zakat has also been extended to the printer to allow users to print the document and calculator to allow users to calculate their zakat. Zakat use case is as figure 4.15.



**Figure 4.15:** Zakat Use Case

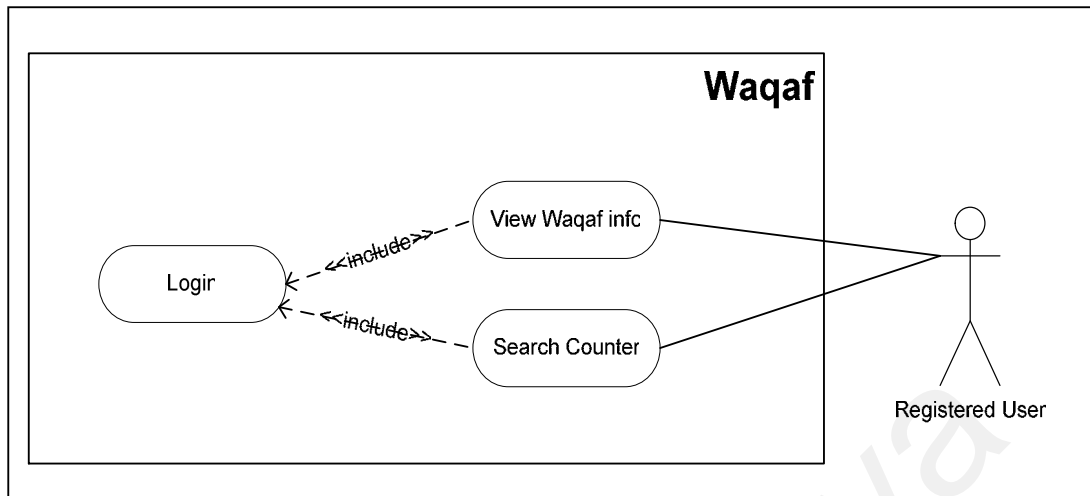
In Fidiah, it has been included with login feature to make sure that only registered users have access to the fidiah module and use its features. Fidiah has also been extended to the printer to allow users to print the document and calculator to allow users to calculate their fidiah. Fidiah use case is as figure 4.16.



**Figure 4.16:** Fidiah Use Case

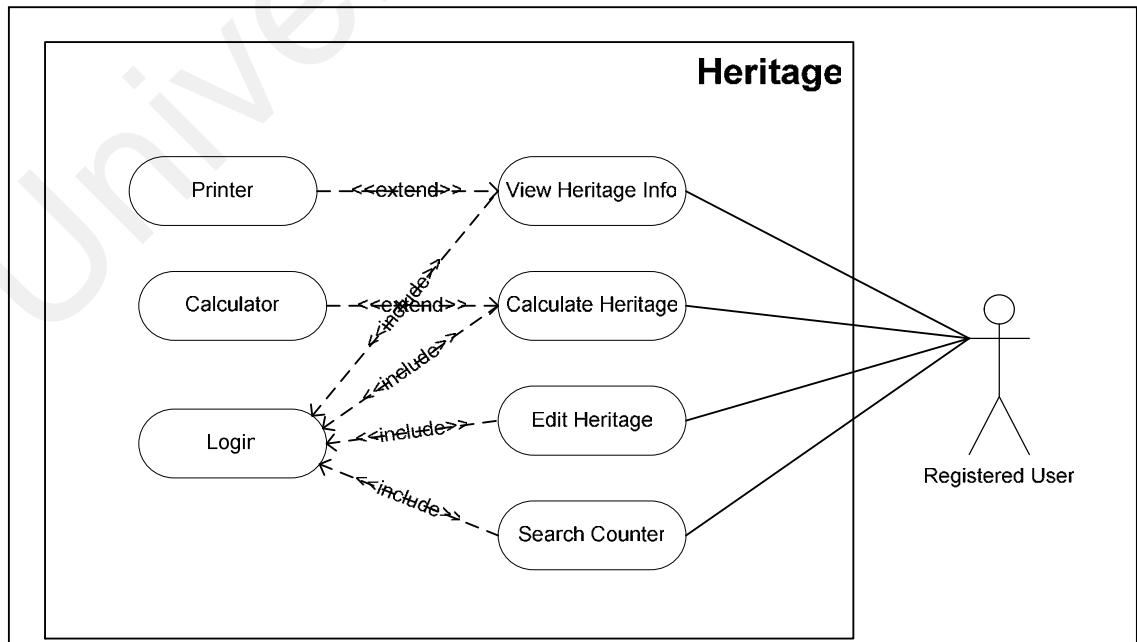
In Waqaf, it has been included with login feature to make sure that only registered users have access to the Waqaf module and use its features. Waqaf use case is as figure 4.17.





**Figure 4.17:** Waqaf Use Case

In Heritage, it has been included with login feature to make sure that only registered users have access to the Heritage module and use its features. Heritage has also been extended to the printer to allow users to print the document and calculator to allow users to calculate their Heritage. Heritage use case is as figure 4.18:



**Figure 4.18:** Heritage Use Case

In the third step, use case description is described in the use case description template.

Table 4.12 to Table 4.38 show the use case description using use case description template.

**Table 4.12:** Use Case Description for Login

Name	Login	
Actor	Registered User, System Admin	
Description	Describes the procedures to log into the system	
Typical course of event	<u>Actor Action</u> 1. Enter username and password.	<u>System Response</u> 2. The system verifies the password. 3. Allow user to enter the system.
<b>Alternative</b> <ul style="list-style-type: none"> <li>• Step3: User entered the wrong username and/or password. System did not allow user to enter the system.</li> </ul>		

**Table 4.13:** Use Case Description for Printer

Name	Printer	
Actor	General User, Registered User	
Description	Describes the procedures print from the system	
Typical course of event	<u>Actor Action</u> 1. Click on the 'print' button at the target page.	<u>System Response</u> 2. The system understands the command and print the page.

**Table 4.14:** Use Case Description for Calculator

Name	Calculator	
Actor	Registered User	
Description	Describes the procedures calculate zakat, fidiah and heritage.	
Typical course of event	<u>Actor Action</u> 1. Enter needed variables to be calculated 2. Click on the 'calculate' button	<u>System Response</u> 3. The system understands the command and gives the calculation results.

**Table 4.15:** Use Case Description for Search Archive

Name	Search Archive	
Actor	Registered User.	
Description	Describes the procedures to search archive.	
Typical course of event	<u>Actor Action</u> 1. Key in the keyword to be searched in the archive. 1. Click on one of the listed files.	<u>System Response</u> 2. The system list down files that matched with the keyword. 2. The system will display the requested information.

**Table 4.16:** Use Case Description for Register as User

Name	Register as User	
Actor	Normal User	
Description	Describes the procedures to register as a user.	
Typical course of event	<u>Actor Action</u> 3. Click on the 'sign-in' button  1. Fill in the required information including username and password.	<u>System Response</u> 4. The system will give the empty personal details form to be completed  2. System saves all the information.
<b>Alternative</b> <ul style="list-style-type: none"> <li>• Step 4: User entered the username that already existed in the system database. System will alert user to use another username.</li> </ul>		

**Table 4.17:** Use Case Description for View General Info

Name	View General Info	
Actor	General User, Registered User	
Description	Describes the procedures to view the general info.	
Typical course of event	<u>Actor Action</u> 3. Key in the correct address to enter into the system	<u>System Response</u> 4. The system views the requested information.

**Table 4.18:** Use Case Description for Change Password

Name	Change Password	
Actor	Registered User	
Description	Describes the procedures to change password.	
Typical course of event	<p><u>Actor Action</u></p> <ol style="list-style-type: none"> <li>1. Click on the menu to change password.</li> <li>2. Key in the old password and the new password twice for confirmation.</li> </ol>	<p><u>System Response</u></p> <ol style="list-style-type: none"> <li>3. The system will check the old password and updates the new password.</li> </ol>
<p><b>Alternative</b></p> <ul style="list-style-type: none"> <li>• Step 3: User entered the wrong old password that is not a match with the password in the system database. User has to re-enter the correct old password.</li> </ul>		

**Table 4.19:** Use Case Description for Update Profile

Name	Update Profile	
Actor	Registered User	
Description	Describes the procedures to update profile.	
Typical course of event	<p><u>Actor Action.</u></p> <ol style="list-style-type: none"> <li>1. Click on the menu to view own profile.</li> <li>2. Key in the new information to update the profile</li> </ol>	<p><u>System Response</u></p> <ol style="list-style-type: none"> <li>3. The system updates the data.</li> </ol>

**Table 4.20:** Use Case Description for View Profile

Name	View Profile	
Actor	Registered User	
Description	Describes the procedures to view profile.	
Typical course of event	<u>Actor Action</u>  1. Click on the menu to view own profile.	<u>System Response</u>  2. The system displays the required information.

**Table 4.21:** Use Case Description for Reset Password

Name	Reset Password	
Actor	System Admin	
Description	Describes the procedures to reset password.	
Typical course of event	<u>Actor Action</u>  1. Click on the menu to reset password.  2. Select the user that wants to reset the password.  3. Click on 'Reset Password' button.	<u>System Response</u>  4. The system set the password to the default password.

**Table 4.22:** Use Case Description for Edit User

Name	Edit User	
Actor	System Admin	
Description	Describes the procedures to edit user.	
Typical course of event	<p><u>Actor Action</u></p> <ol style="list-style-type: none"> <li>1. Click on the menu to edit user.</li> <li>3. Click on the user name to view the detail information.</li> <li>5. Click on the ‘update’ link at the user to be updated.</li> <li>7. Update users’ data by entering the new data and click ‘Update’ button.</li> <li>9. Click on the ‘Delete’ link at the user to be deleted.</li> <li>11. Click on the ‘Delete’ button.</li> <li>13. Click on ‘yes’ to confirm on deleting the data.</li> </ol>	<p><u>System Response</u></p> <ol style="list-style-type: none"> <li>2. The list of users will be displayed.</li> <li>4. The users’ detail information will be displayed.</li> <li>6. The user details in editable format will be displayed.</li> <li>8. The system updates the data.</li> <li>10. The user details will be displayed.</li> <li>12. Notification dialog box will be displayed.</li> <li>14. Data will be deleted from the database.</li> </ol>

**Table 4.23:** Use Case Description for Edit Counter

Name	Edit Counter	
Actor	System Admin	
Description	Describes the procedures to edit counter.	
Typical course of event	<u>Actor Action</u> <ol style="list-style-type: none"> <li>1. Click on the menu to edit counter.</li> <li>3. Click on the counter name to view the detail information.</li> <li>5. Click on the 'update' link at the counter to be updated.</li> <li>7. Update counter data by entering the new data and by clicking the 'Update' button.</li> <li>9. Click on the 'Delete' link at the counter to be deleted.</li> <li>11. Click on the 'Delete' button.</li> <li>13. Click on 'yes' to confirm on deleting the data.</li> <li>15. To add new counter, click on the 'Add Counter'</li> </ol>	<u>System Response</u> <ol style="list-style-type: none"> <li>2. The list of counter will be displayed.</li> <li>4. The counter detail information will be displayed.</li> <li>6. The counter details in editable format will be displayed.</li> <li>8. The system updates the data.</li> <li>10. The counter details will be displayed.</li> <li>12. Notification dialog box will be displayed.</li> <li>14. Data will be deleted from the database.</li> <li>16. Add counter form is displayed.</li> <li>17. The entered data has been added into the database.</li> </ol>



	<p>button.</p> <p>16. Fill in the required information and click 'Save' button</p>	
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**Table 4.24:** Use Case Description for Waqaf Counter

Name	Search Waqaf Counter	
Actor	Registered User	
Description	Describes the procedures to view the waqaf counter.	
Typical course of event	<u>Actor Action</u> <ol style="list-style-type: none"> <li>1. Click on the menu to view waqaf counter.</li> <li>3. Select the state to search the waqaf counter.</li> </ol>	<u>System Response</u> <ol style="list-style-type: none"> <li>2. The system views the selection box.</li> <li>4. The Waqaf counter for the selected state is displayed.</li> </ol>

**Table 4.25:** Use Case Description for View Waqaf Info

Name	View Waqaf Info	
Actor	Registered User	
Description	Describes the procedures to view the waqaf info.	
Typical course of event	<u>Actor Action</u> <ol style="list-style-type: none"> <li>1. Click on the menu to view waqaf info.</li> </ol>	<u>System Response</u> <ol style="list-style-type: none"> <li>2. The system views the requested information.</li> </ol>

**Table 4.26:** Use Case Description for Edit Archive

Name	Edit Archive	
Actor	System Admin	
Description	Describes the procedures to edit archive.	
Typical course of event	<p><u>Actor Action</u></p> <ol style="list-style-type: none"> <li>1. Click on the menu to edit archive.</li> <li>3. To upload new document click on the 'Upload' button.</li> <li>5. Fill in the required information and click on the 'Upload' button.</li> <li>7. Click on the 'Delete' link at the archive data to be deleted.</li> <li>11. Click on the 'Delete' button.</li> <li>13. Click on 'yes' to confirm on deleting the data.</li> </ol>	<p><u>System Response</u></p> <ol style="list-style-type: none"> <li>2. List of archive data will be displayed with upload and delete button.</li> <li>4. Upload form has been displayed.</li> <li>6. The document is uploaded.</li> <li>8. The archive details will be displayed.</li> <li>12. Notification dialog box will be displayed.</li> <li>14. Data will be deleted from the database.</li> </ol>

**Table 4.27:** Use Case Description for Calculate Zakat

Name	Calculate Zakat	
Actor	Registered User	
Description	Describes the procedures to calculate zakat.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to calculate zakat.  3. Select the zakat type.  5. Enter the required value and click on the 'Calculate' button.  7. Click on the 'Save' button to save the calculated zakat amount.	<u>System Response</u> 2. The system views the selection of zakat calculator based on its type. 4. The zakat calculator based on the selected type is displayed. 6. The zakat amount is displayed. 8. The data has been saved.

**Table 4.28:** Use Case Description for Zakat Info

Name	View Zakat Info	
Actor	Registered User	
Description	Describes the procedures to view the zakat info.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to view zakat info.	<u>System Response</u> 2. The system views the requested information.

**Table 4.29:** Use Case Description for Edit Zakat

Name	Edit Zakat	
Actor	Registered User	
Description	Describes the procedures to edit zakat.	
Typical course of event	<p><u>Actor Action</u></p> <ol style="list-style-type: none"> <li>1. Click on the menu to edit zakat.</li> <li>3. Select the 'Update' link at zakat to be updated.</li> <li>5. Update zakat status and click on the 'Update' button.</li> <li>7. To delete the calculated zakat, click on the 'Delete' link which zakat to be deleted.</li> <li>9. Click on the 'Delete' button.</li> <li>11. Click 'Yes' button.</li> </ol>	<p><u>System Response</u></p> <ol style="list-style-type: none"> <li>2. The system views the list of zakat.</li> <li>4. The selected zakat information with zakat status in editable format is displayed.</li> <li>6. The data is updated.</li> <li>8. The selected zakat information is displayed.</li> <li>10. Confirmation box is displayed.</li> <li>12. Data is deleted.</li> </ol>

**Table 4.30:** Use Case Description for Search Zakat Counter

Name	Search Zakat Counter	
Actor	Registered User	
Description	Describes the procedures to view the zakat counter.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to view zakat counter. 3. Select the state to search the zakat counter.	<u>System Response</u> 2. The system views the selection box. 4. The zakat counter for the selected state is displayed.

**Table 4.31:** Use Case Description for Search Fidiyah Counter

Name	Search Fidiyah Counter	
Actor	Registered User	
Description	Describes the procedures to view the fidiyah counter.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to view fidiyah counter. 3. Select the state to search the fidiyah counter.	<u>System Response</u> 2. The system views the selection box. 4. The fidiyah counter for the selected state is displayed.

**Table 4.32:** Use Case Description for View Fidiah Info

Name	View Fidiah Info	
Actor	Registered User	
Description	Describes the procedures to view the fidiah info.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to view fidiah info.	<u>System Response</u> 2. The system views the requested information.

**Table 4.33:** Use Case Description for Calculate Fidiah

Name	Calculate Fidiah	
Actor	Registered User	
Description	Describes the procedures to calculate fidiah.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to calculate fidiah. 3. Select the fidiah type. 5. Enter the required value and click on the 'Calculate' button. 7. Click on the 'Save' button to save the calculated fidiah amount.	<u>System Response</u> 2. The system views the selection of fidiah calculator based on its type. 4. The fidiah calculator based on the selected type is displayed. 6. The fidiah amount is displayed. 8. The data has been saved.

**Table 4.34:** Use Case Description for Edit Fidiah

Name	Edit Fidiah	
Actor	Registered User	
Description	Describes the procedures to edit zakat.	
Typical course of event	<u>Actor Action</u> <ol style="list-style-type: none"> <li>1. Click on the menu to edit fidiah.</li> <li>3. Select on the 'Update' link at fidiah to be updated.</li> <li>5. Update fidiah status and click 'Update' button.</li> <li>7. To delete the calculated fidiah, click 'delete' link at fidiah to be deleted.</li> <li>9. Click on the 'Delete' button.</li> <li>11. Click on the 'Yes' button.</li> </ol>	<u>System Response</u> <ol style="list-style-type: none"> <li>2. The system views the list of fidiah.</li> <li>4. The selected fidiah information with fidiah status in editable format is displayed.</li> <li>6. The data is updated.</li> <li>8. The selected fidiah information is displayed.</li> <li>10. Confirmation box is displayed.</li> <li>12. Data is deleted.</li> </ol>

**Table 4.35:** Use Case Description for Calculate Heritage

Name	Calculate Heritage	
Actor	Registered User	
Description	Describes the procedures to calculate heritage.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to calculate heritage.  3. Select the heritage type.  5. Enter the number of heirs and click on the 'Calculate' button.  7. Click on the 'Save' button to save the calculated heritage amount.	<u>System Response</u> 2. The system views the selection of heritage calculator based on its type.  4. The heritage calculator based on the selected type is displayed.  6. The heritage portion for heirs is displayed.  8. The data has been saved.

**Table 4.36:** Use Case Description for View Heritage Info

Name	View Heritage Info	
Actor	Registered User	
Description	Describes the procedures to view the heritage info.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to view heritage info.	<u>System Response</u> 2. The system views the requested information.



**Table 4.37:** Use Case Description for Edit Heritage

Name	Edit Heritage	
Actor	Registered User	
Description	Describes the procedures to edit heritage.	
Typical course of event	<p><u>Actor Action</u></p> <ol style="list-style-type: none"> <li>1. Click on the menu to edit heritage.</li> <li>3. Select the 'Update' link at heritage to be updated.</li> <li>5. Update heritage status and click on the 'Update' button.</li> <li>7. To delete the calculated heritage, click on the 'Delete' link at which heritage to be deleted.</li> <li>9. Click on the 'Delete' button.</li> <li>11. Click on the 'Yes' button.</li> </ol>	<p><u>System Response</u></p> <ol style="list-style-type: none"> <li>2. The system views the list of heritage.</li> <li>4. The selected heritage information with heritage status in editable format is displayed.</li> <li>6. The data is updated.</li> <li>8. The selected heritage information is displayed.</li> <li>10. Confirmation box is displayed.</li> <li>12. Data is deleted.</li> </ol>

**Table 4.38:** Use Case Description for Search Heritage Counter

Name	Search Heritage Counter	
Actor	Registered User	
Description	Describes the procedures to view the heritage counter.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to view heritage counter. 3. Select the state to search the heritage counter.	<u>System Response</u> 2. The system views the selection box. 4. The heritage counter for the selected state is displayed.

**Table 4.39:** Use Case Description for Calculate Kifayah

Name	Calculate Kifayah	
Actor	Normal User	
Description	Describes the procedures to calculate Kifayah.	
Typical course of event	<u>Actor Action</u> 1. Click on the menu to calculate kifayah. 3. Enter the required value and click on the 'Calculate' button.	<u>System Response</u> 2. The system views the kifayah calculator. 4. The kifayah category is displayed.

The use case diagram for Personal Islamic Asset Management System using Object-oriented Approach has been designed using three steps. In the first step the system is combined in one use case. In the second step consists of nine use cases that has been

split from the first step; one for each module. There are more details in the use cases in the second step. In the third step, login has been included and printer as well as calculator has been extended to the use cases. The complete use case diagram can be viewed in Appendix B.

### **4.3 Non-functional Requirement**

The non-functional requirements for the system concern with how well the system performs. This includes the security, reliability, usability, accessibility, flexibility, scalability and maintainability. A non-functional requirement also covers the hardware and software specification of the system.

The object-oriented Personal Islamic Asset Management System using Object-oriented Approach is a brand new system and should have these capabilities:

- Usability – The system should be easy to use for any level of users since it is a browse based system.
- Security – The system includes login page where users need to enter login ID and password in order to use the system. The password stored in the database has been encrypted.
- Accessibility – The system should be available and accessible at 24 x 7.
- Flexibility – The system should be flexible for future integration and enhancement. Moreover, it uses English language to enable it to be used worldwide.

### 4.3.1 Hardware Requirement

Hardware requirement is the machine requirement in order to develop or run the system.

The hardware requirement for this system has been summarized in the table 4.40 below.

**Table 4.40:** Hardware Requirement

<b>Minimum Requirements</b>	
Computer/Processor	133 MHz or higher Pentium-compatible CPU.
Memory	At least 128 megabytes (MB) of RAM; more memory generally improves responsiveness.
Hard Disk	3 GB with 1 GB free space.
CPU Support	Windows 2000/XP or Linux
Drive	CD-ROM or DVD drives.
Display	VGA or higher resolution monitor.
Keyboard	Required.
Mouse	Required.
Network Port	Required. At least with 10/100 Base T.

### 4.3.2 Software Requirement

Software requirement is the required software to develop the system. The software requirement has been summarized in the table 4.41 below.

**Table 4.41:** Software requirement

<b>Development tool</b>	Macromedia Dreamweaver MX
<b>Programming language</b>	PHP
<b>Database</b>	mysql
<b>Image editing tool</b>	Adobe Photoshop 5.0.2
<b>System model/design</b>	Rational Rose 2003 Enterprise Edition
<b>System planning</b>	Microsoft Project

#### 4.4 Conclusion

This chapter discussed requirement analysis, which emphasized on functional and non-functional requirements of the system. The functional requirements described what system does including use case actor, illustration and description. The non-functional requirement described the system performance. The system design will be discussed in the next chapter. The detailed design of the system will be described using layered architecture diagram, class diagram, sequence diagram, database design and interface design.

## **Chapter 5**

### **System Design**

#### **5.1 Introduction**

By employing the Rational Unified Process (RUP) model in this chapter, it also maps with the elaboration phase that is described in the system architecture and development plan for Personal Islamic Asset Management System using Object-oriented Approach. It elaborates the system design starting from system design and modeling, database design up to interface design. The elaboration has been supported by layered architecture, class diagram, sequence diagram and entity relational diagram to illustrate the real system.

#### **5.2 System Design and Modeling**

UML methodology has been used for the system design and modeling. During system design, the sub-modules and major modules have been identified. In this section, the layered architecture, class diagram and sequence diagram for the system are discussed. Layered architecture is a division on network model into multiple discrete layers or levels through which message pass as they are prepared for transmission. Class diagram is the backbone of the system where it describes the static structure of a system. Classes

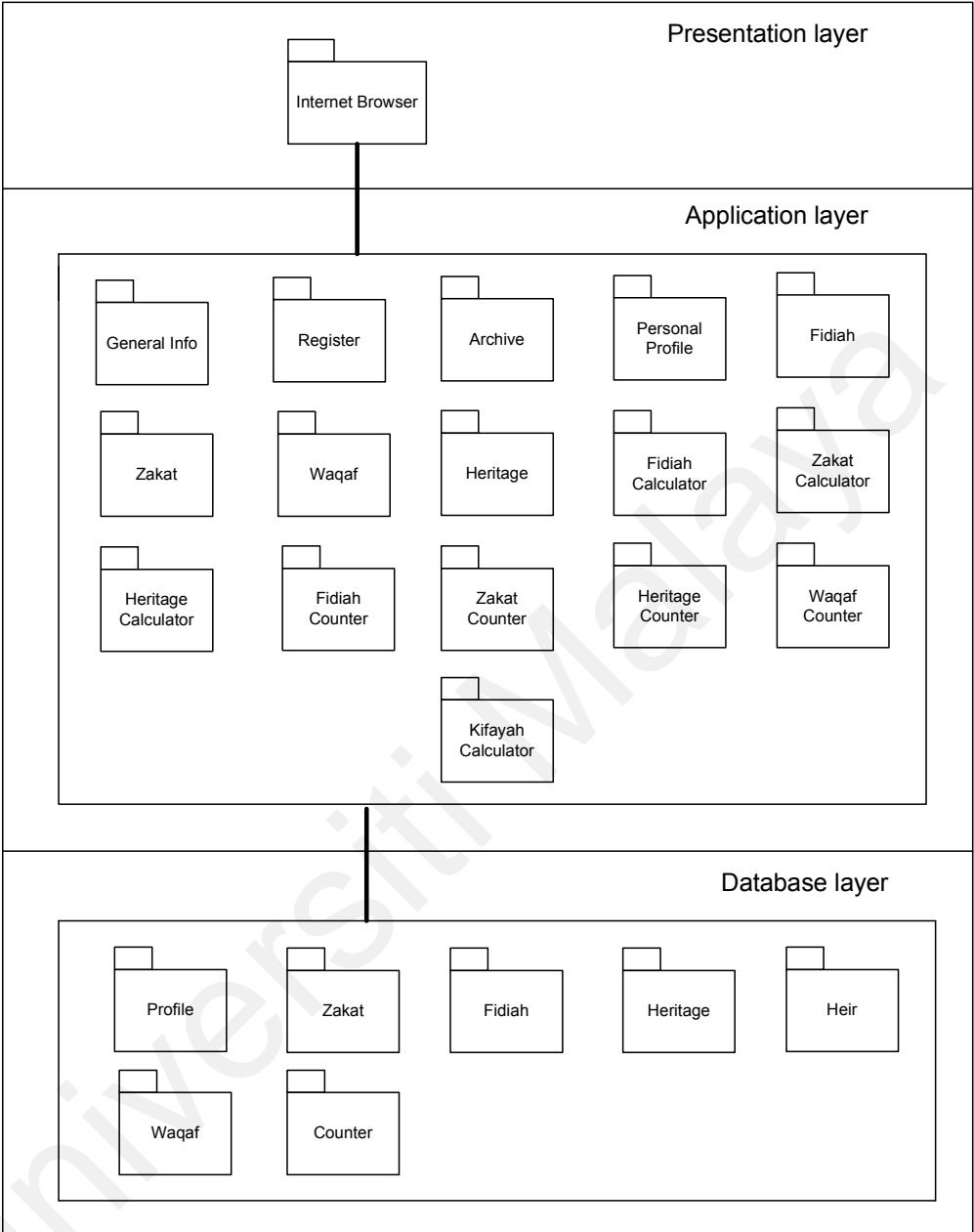
represent an abstraction of entities with common characteristics. Associations represent the relationship between classes. Sequence diagram shows an attraction between objects arranged in a time sequence. It represents the detailed object interaction that occurs for one module.

The Personal Islamic Asset Management System using Object-oriented Approach basically consists of nine main modules, which are general information module, admin module, archive module, zakat module, fidiah module, heritage module, waqaf module, user profile module and registration module.

All users can access the system through web but they only can view the Personal Islamic Asset Management System using Object-oriented Approach general page. Only registered users, those who have the user ID and password can access zakat module, fidiah module, heritage module, waqaf module and archive module. Admin module only can be accessed by system administrator. In order to get the user ID and password, user has to register to this system. The registration can be done online.

### **5.2.1 Layered Architecture**

Layered architecture for Personal Islamic Asset Management consists of three layers which are presentation layer, application layer and database layer. In layered architecture, protocols are at each layer provide specific services or function rely on protocols in the layers above and below them for other needed services. The layered architecture for Personal Islamic Asset Management System using Object-oriented Approach is illustrated in figure 5.1.



**Figure 5.1:** Layered Architecture



### 5.2.2 Class Diagram

By definition, a class diagram is a diagram showing a collection of classes and interfaces, along with the collaborations and relationships among classes and interfaces.

A class diagram is a pictorial representation of the detailed system design or known as a static view of the system.

Class diagram is related to the use case diagram that has been designed in Chapter Four. While designing the use cases, the “what” of the requirements of the system has been taken into consideration, and the aim of designing classes is to convert this "what" to a "how" for each requirement. Each use case is further analyzed and broken up into atomic components that form the basis for the classes that need to be designed.

In designing the class diagram for Personal Islamic Asset Management System using Object-oriented Approach, there are several things that must be considered. First, the main class of the system including its attributes has to be identified. Second, how the classes are related to each other has to be determined. Third, the characteristics of each class have to be identified. Fourth, relations among classes have to be found and finally, the inheritance of personal traits and characteristics has to be decided.

Just like the use case diagram in the previous chapter, the class diagram is constructed by using three steps. These three steps have to be applied because in step 1, only the class of the system has been constructed. Whilst in step 2 the attributes and methods have been defined. In step 3, the relationship between classes either it is normal, aggregation or generalization have been clearly identified. Finally, the complete class diagram has been designed.

***Step 1:***

The class diagram of Personal Islamic Asset Management System using Object-oriented Approach is built after a careful analysis of the requirements. In the previous chapter, the primary actors and use cases have been identified in the use case model of the system. As the groundwork of the analysis has been done while building the use case model, those analysis steps has been used as the basis for identifying the classes and interfaces of this system.

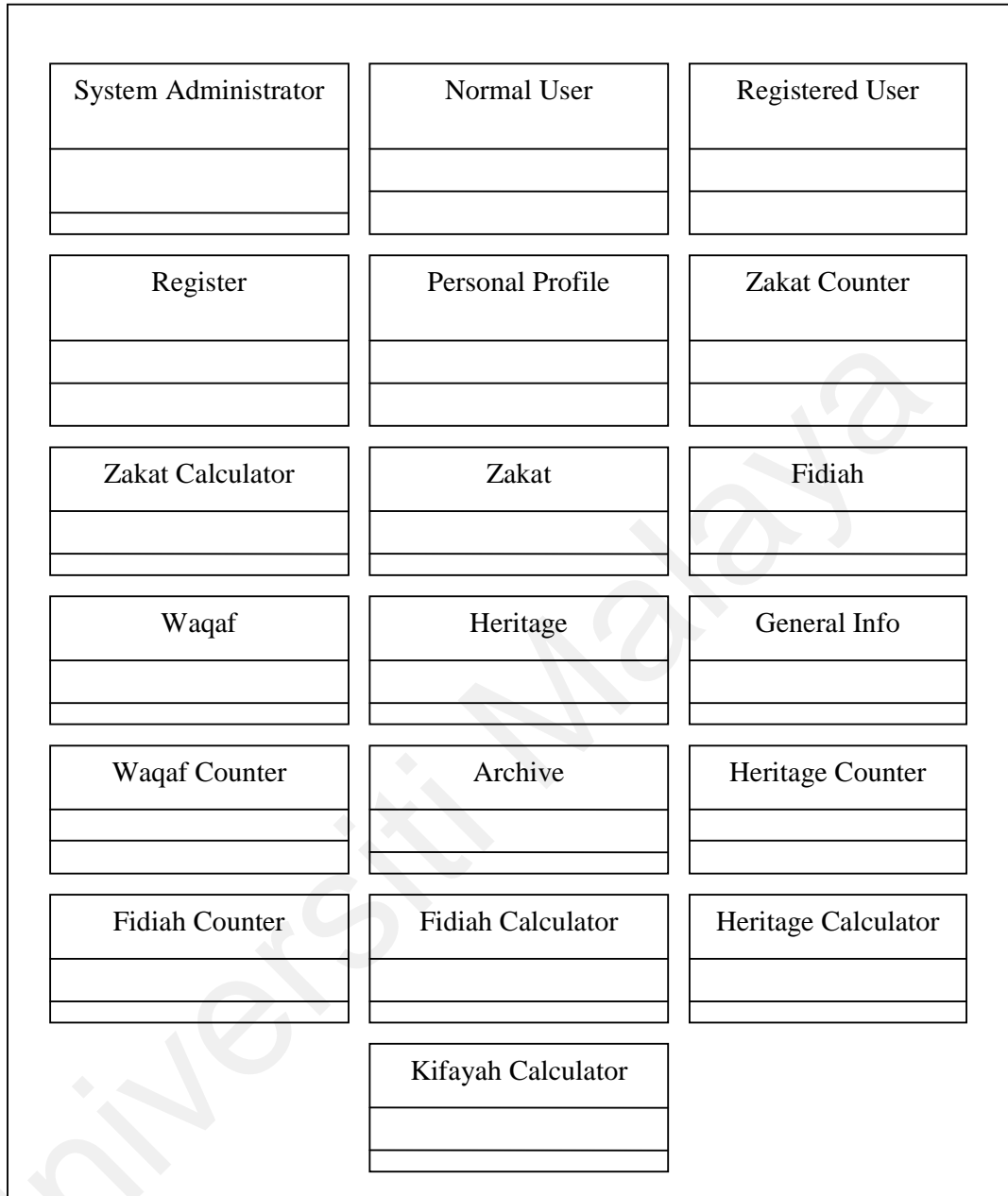
The classes of the Personal Islamic Asset Management System using Object-oriented Approach have been identified using incremental approach. The active entities of the system have been identified. The active entities are the classes and interfaces that reflect important entities of the business domain of the system being modeled. At the first glance, the actors identified in the use case appear to be the potential classes. So, the first list of classes in the system is:

- System Administrator
- General User
- Registered User

Then, the passive entities of the system have been identified. The passive entities are the entities that reflect to the business domain. Some of the business domain classes hold transient data and some hold persistent data for the application. The business domain classes are:

- Register
- Personal Profile
- Waqaf Counter
- Zakat
- Fidiah
- Waqaf
- Zakat Calculator
- Kifayah Calculator
- Heritage Counter
- Heritage
- General Info
- Archive
- Zakat Counter
- Fidiah Counter
- Fidiah Calculator
- Heritage Calculator

The nineteen classes for Personal Islamic Asset Management System using Object-oriented Approach is as figure 5.2 below.



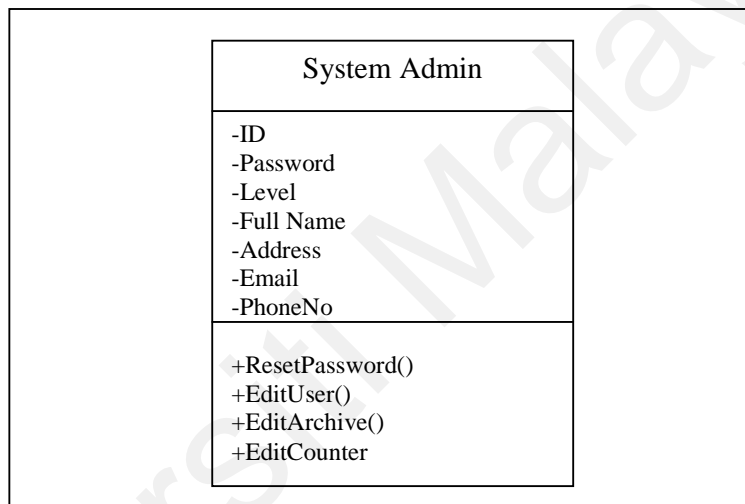
**Figure 5.2:** Classes in Personal Islamic Asset Management System using Object-oriented Approach

**Step 2:**

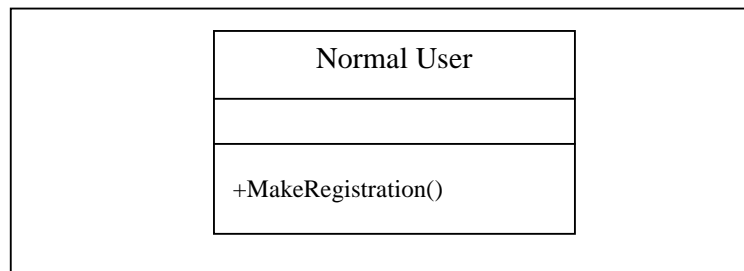
In second step, those classes will become the method in the system. Class represents an entity of a system that provides an encapsulated implementation of certain functionality of a given entity. These are exposed by the class to other classes as method. Apart

from functionality, a class also has properties that reflect unique features of a class. The properties of a class are called attributes.

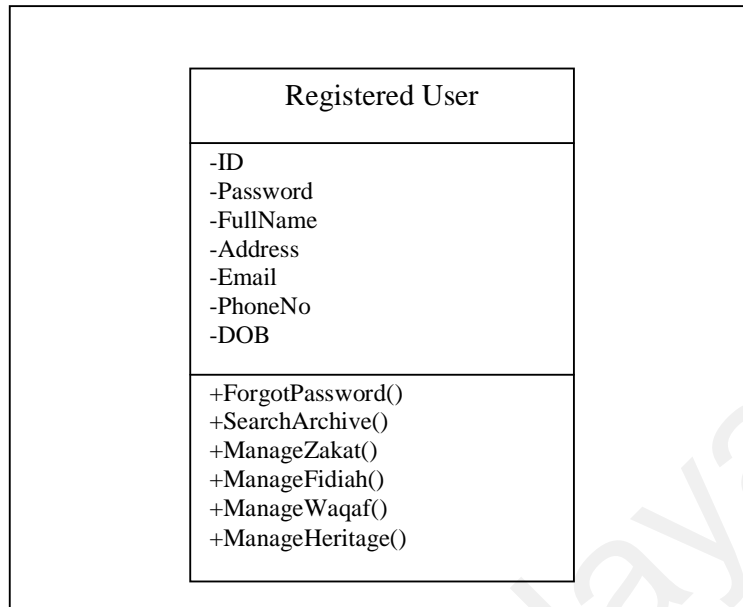
The classes for Personal Islamic Asset Management System using Object-oriented Approach including its method and attributes are shown in Figure 5.3 to Figure 5.21.



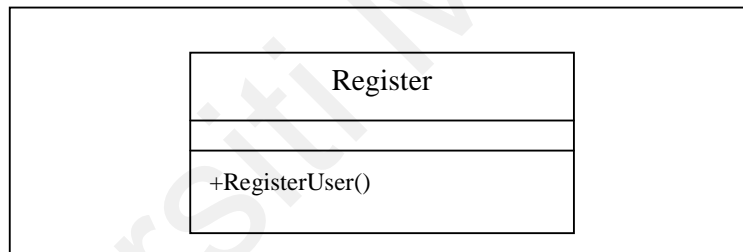
**Figure 5.3:** System Admin class



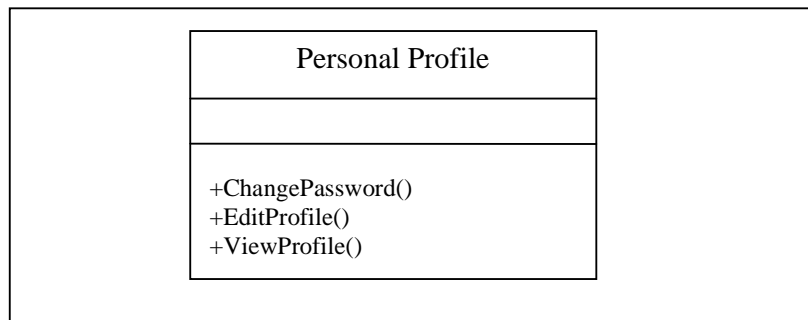
**Figure 5.4:** Normal User class



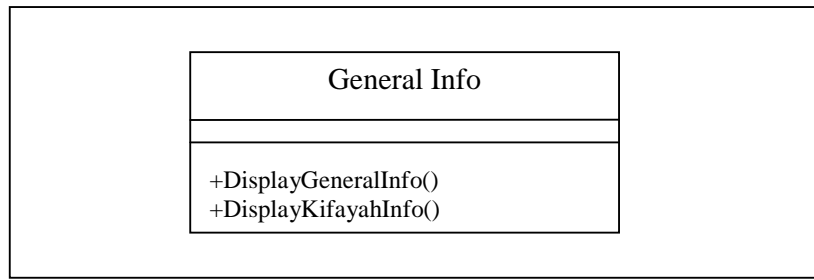
**Figure 5.5:** Registered User Class



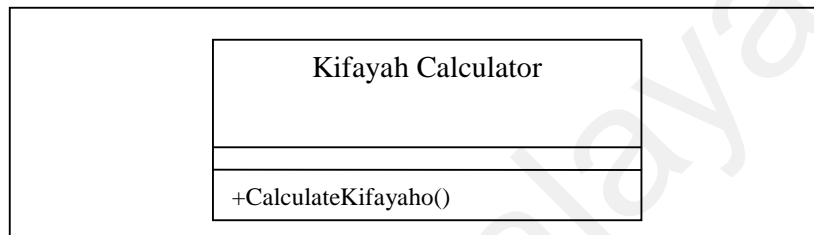
**Figure 5.6:** Register class



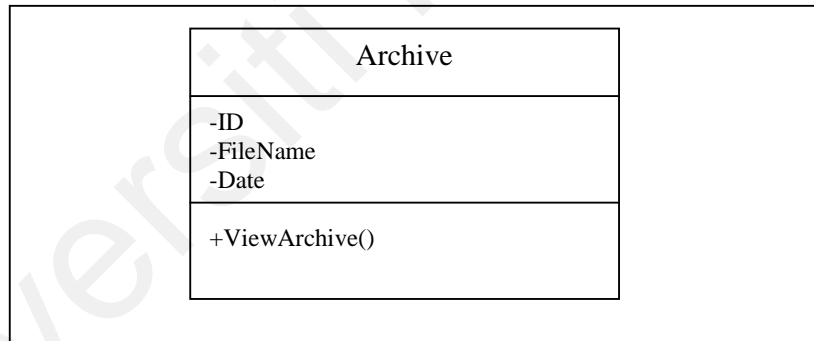
**Figure 5.7:** Personal Profile class



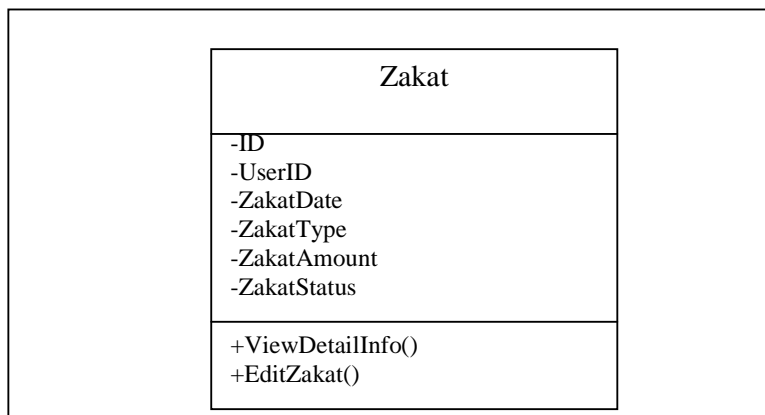
**Figure 5.8:** General Info class



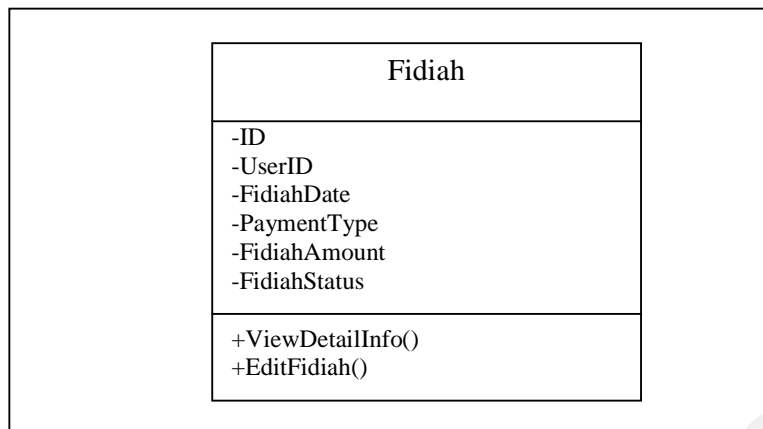
**Figure 5.9:** Kifayah Calculator class



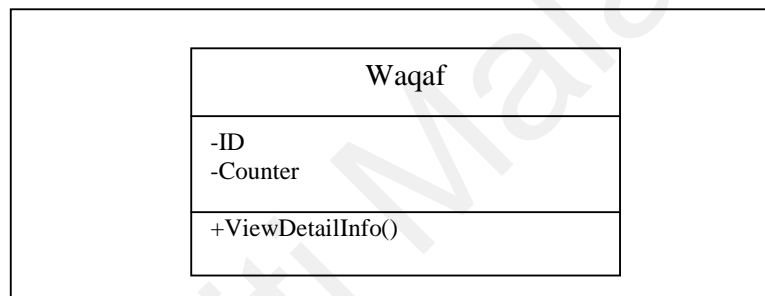
**Figure 5.10:** Archive class



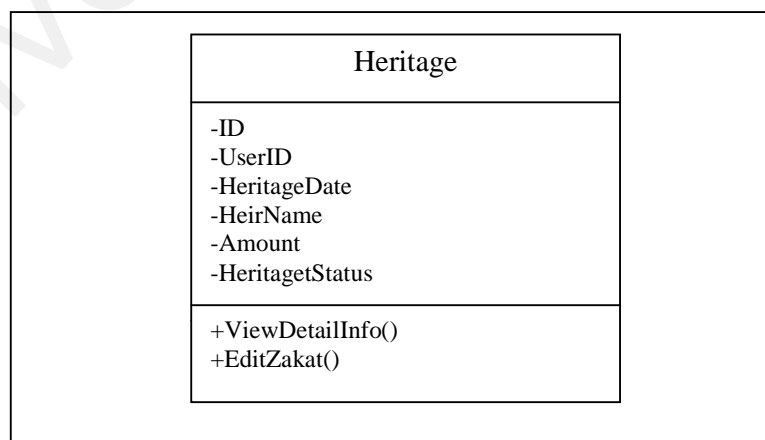
**Figure 5.11:** Zakat class



**Figure 5.12:** Fidiah class

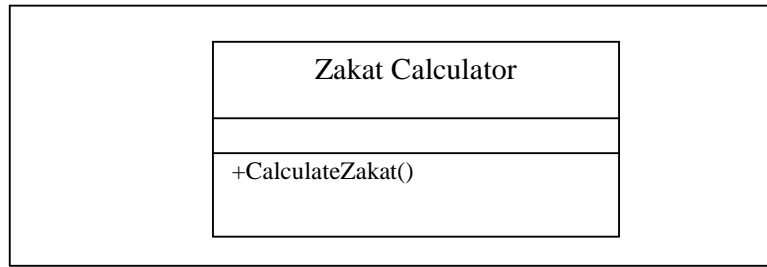


**Figure 5.13:** Waqaf class

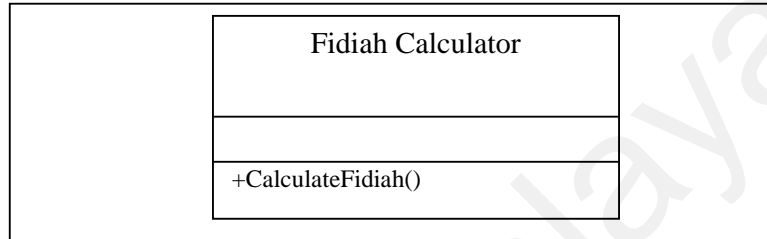


**Figure 5.14:** Heritage class

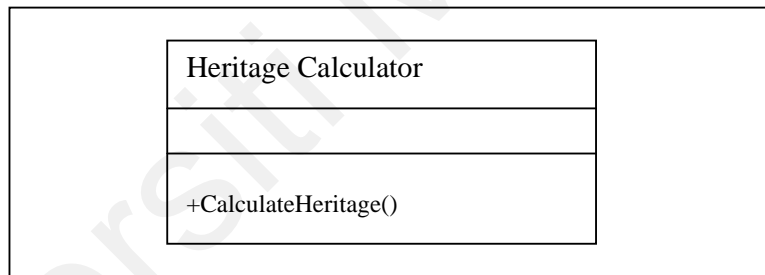




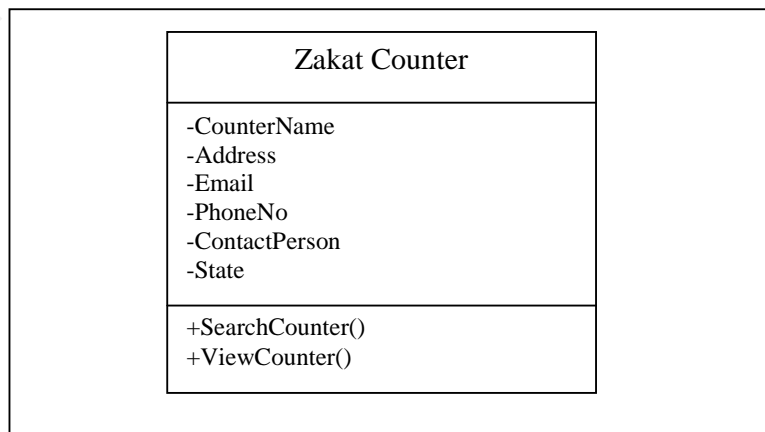
**Figure 5.15:** Zakat Calculator class



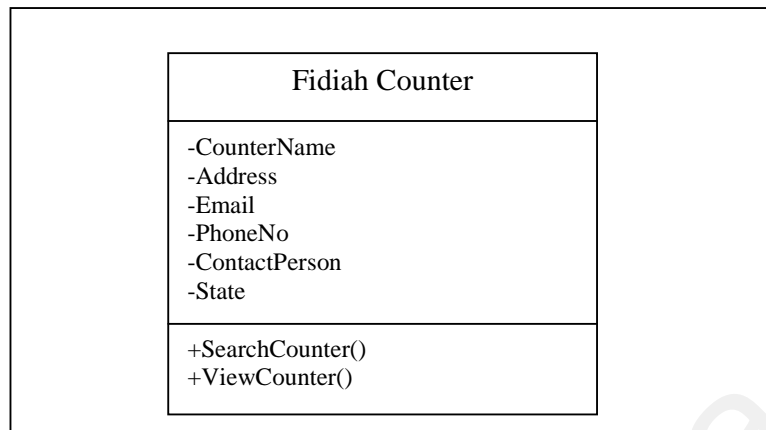
**Figure 5.16:** Fidiah calculator class



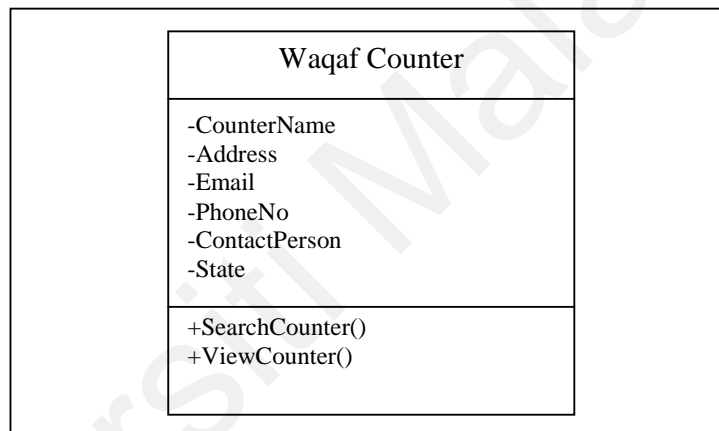
**Figure 5.17:** Heritage Calculator class



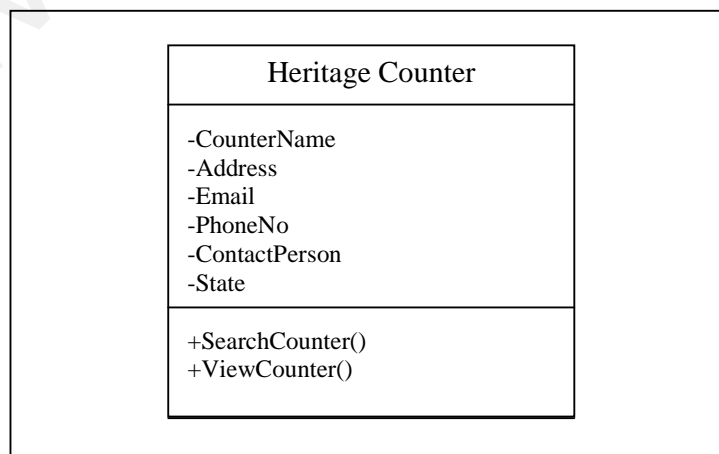
**Figure 5.18:** Zakat Counter class



**Figure 5.19:** Fidiah Counter class



**Figure 5.20:** Waqaf Counter class



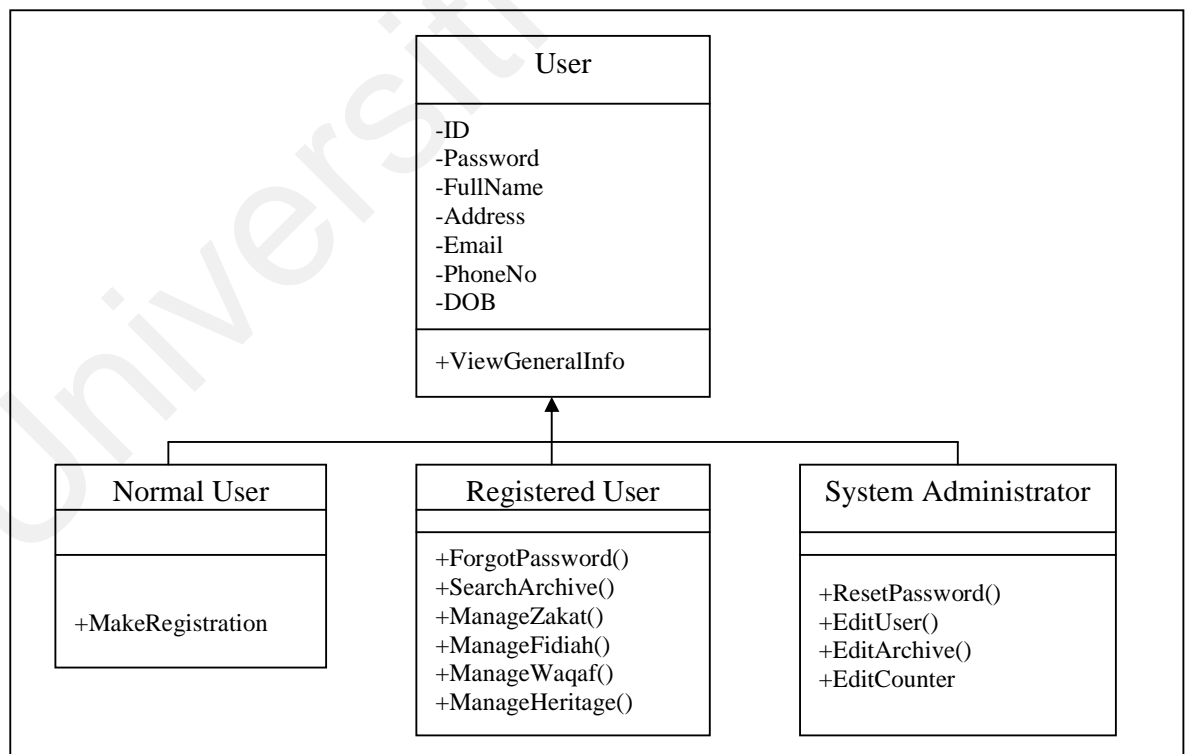
**Figure 5.21:** Heritage Counter class

**Step 3:**

In the third step, the classes above have been revisited and revised by identifying shared features and common functionality between classes. Then the relationships and dependencies between classes will be defined. To define the relationship between classes, the interconnections between classes have to be analyzed. Relationship analysis can be broken up into three phases:

Phase 1: Identifying relationship between active entities.

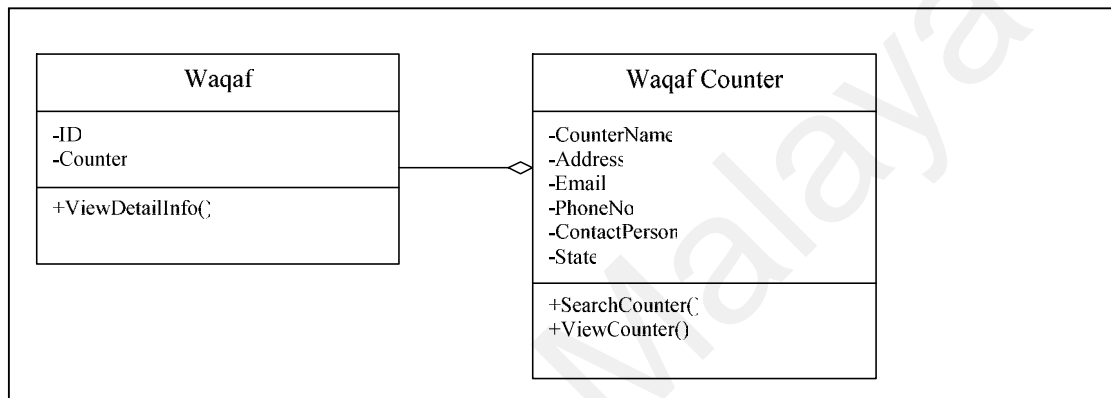
Active entities normally share generalization relationship. Essentially, the common attributes and functionality between classes are defined in a common parent class. All the related child classes inherit functionality from the parent class. In Personal Islamic Asset Management System using Object-oriented Approach, there is the inheritance relationship between the active entities as figure 5.22:



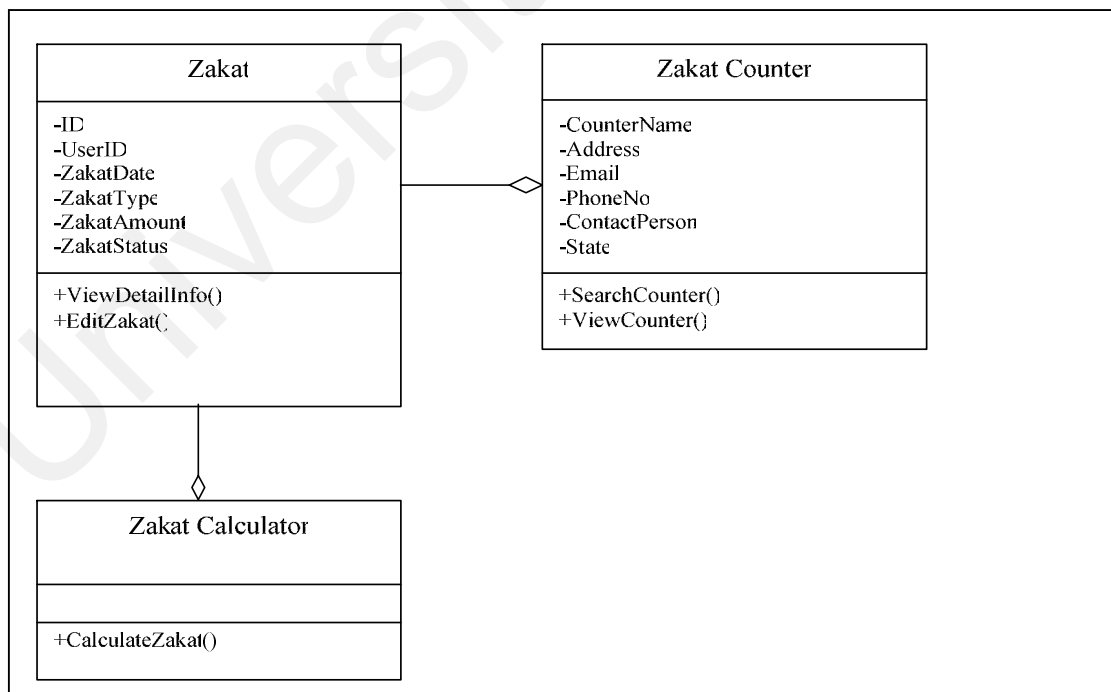
**Figure 5.22:** Inheritance Relationship of Personal Asset Management System using Object-oriented Approach

Phase 2: Identifying relationship between passive entities.

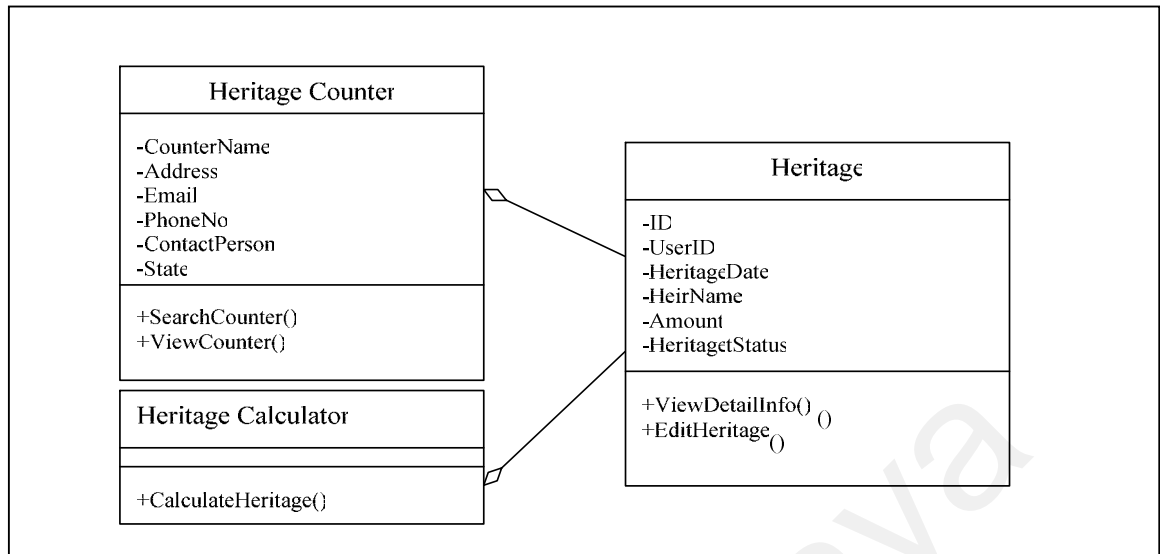
Passive entities frequently share plain association or aggregation relationship. This is especially true because these passive entities are non transactional in nature and reflect data more than behavior. Some of the classes in Personal Islamic Asset Management System using Object-oriented Approach do exhibit aggregation relationships as figure 5.23 to figure 5.27:



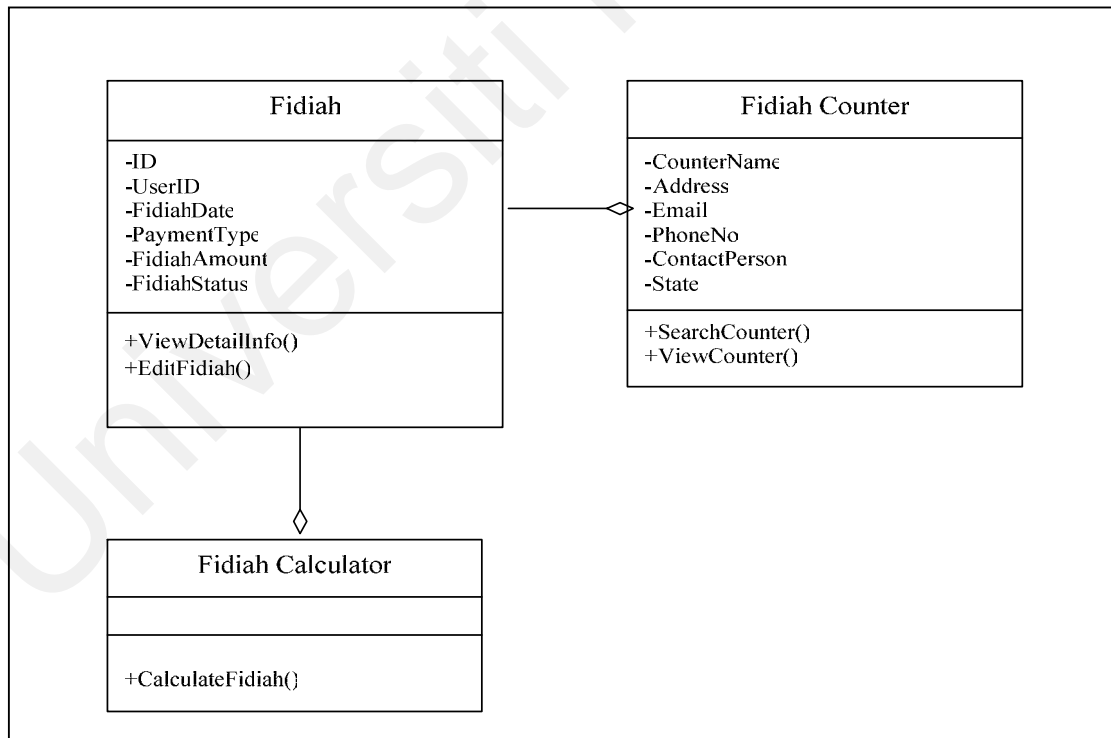
**Figure 5.23:** Aggregation relationship between waqaf and waqaf counter.



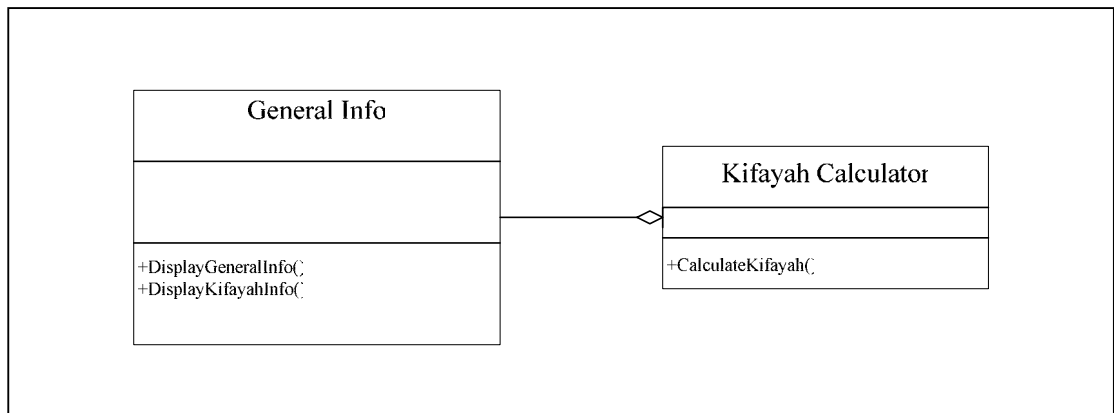
**Figure 5.24:** Aggregation relationship between Zakat, Zakat Counter and Zakat calculator.



**Figure 5.25:** Aggregation relationship between Heritage, Heritage Counter and Heritage calculator.



**Figure 5.26:** Aggregation relationship between Fidah, Fidah Counter and Fidah calculator.



**Figure 5.27:** Aggregation relationship between General Info and kifayah calculator

Step 3: Identify relationship between active and passive entities.

Relationships between active and passive entities can easily be represented using direct association. The direct association provides easy identification of which is the container class and which is the contained class. Figure 5.28 shows the class diagram for Personal Islamic Asset Management System using Object-oriented Approach.

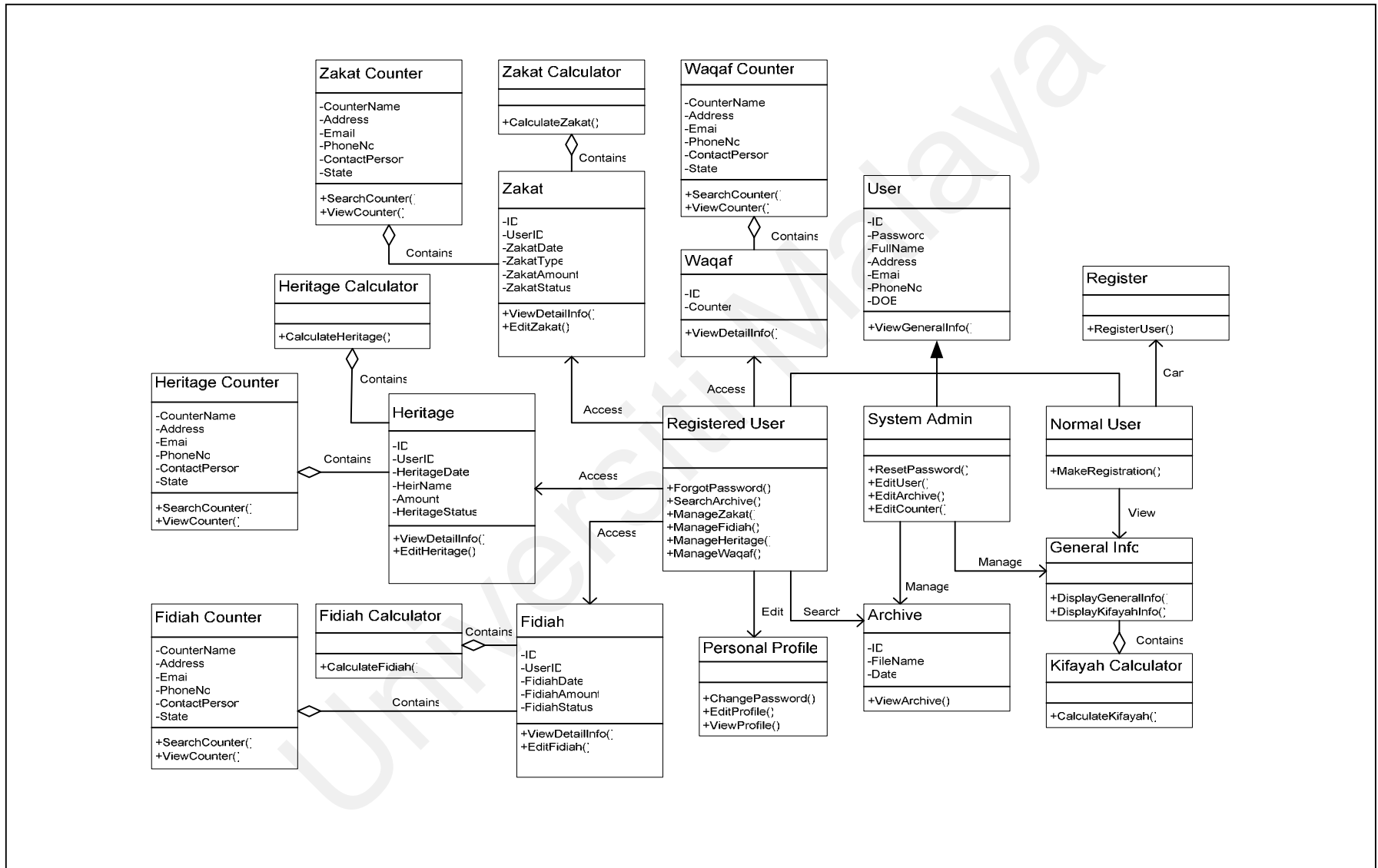
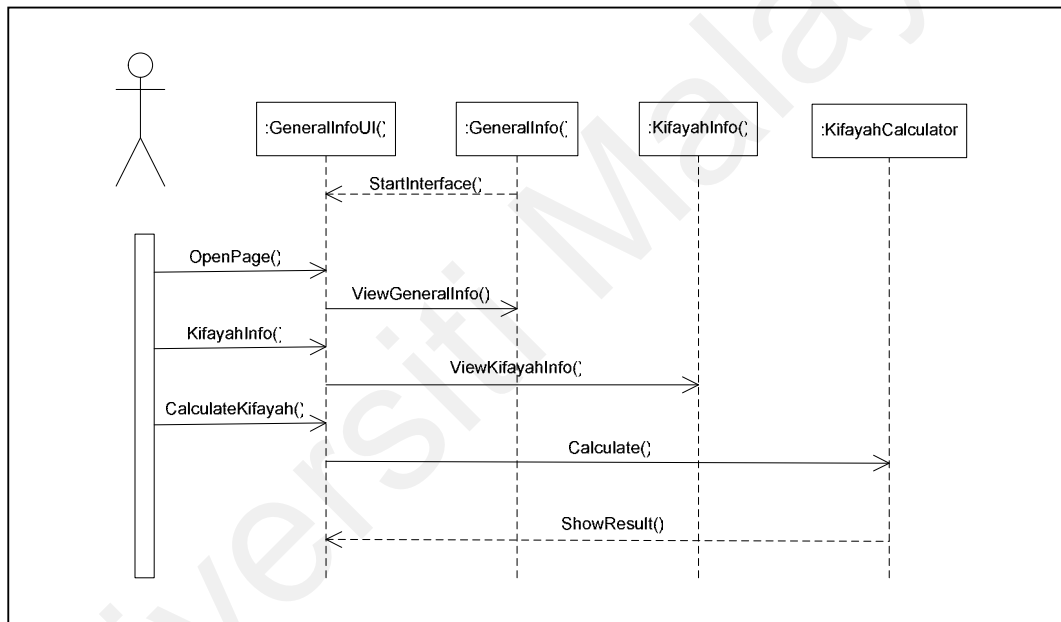


Figure 5.28: Class Diagram

## 5.2.6 Sequence Diagram

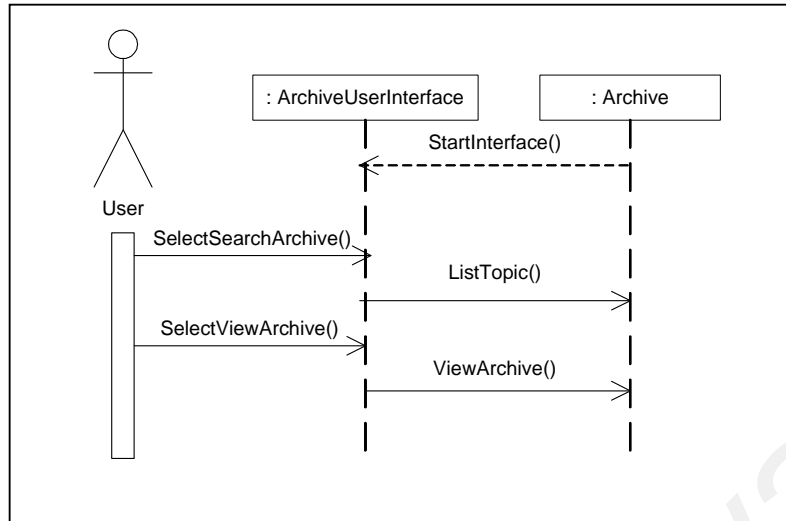
Following is the sequence diagram for Personal Islamic Asset Management System using Object-oriented Approach. The sequence diagram has been illustrated by modules. Figure 5.29 shows the sequence diagram for general information module. It shows that normal user can access general information module to view the information about Personal Islamic Asset Management System using Object-oriented Approach.



**Figure 5.29:** Sequence diagram for general info.

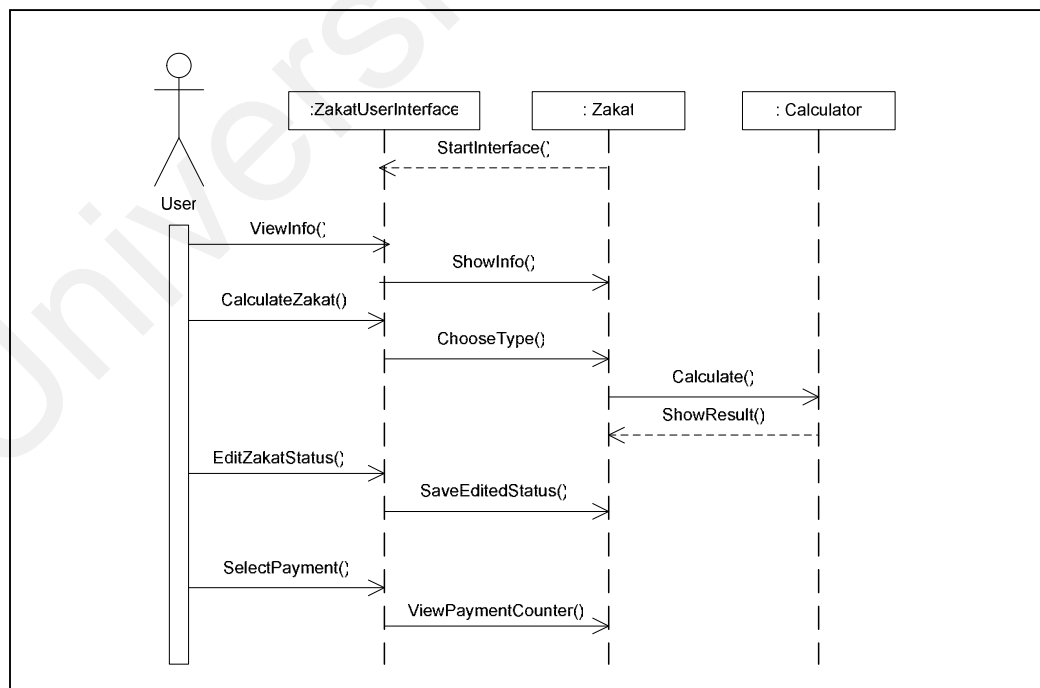
Figure 5.30 shows the sequence diagram for archive module. Registered user can access archive module, where they can search and view the archive.





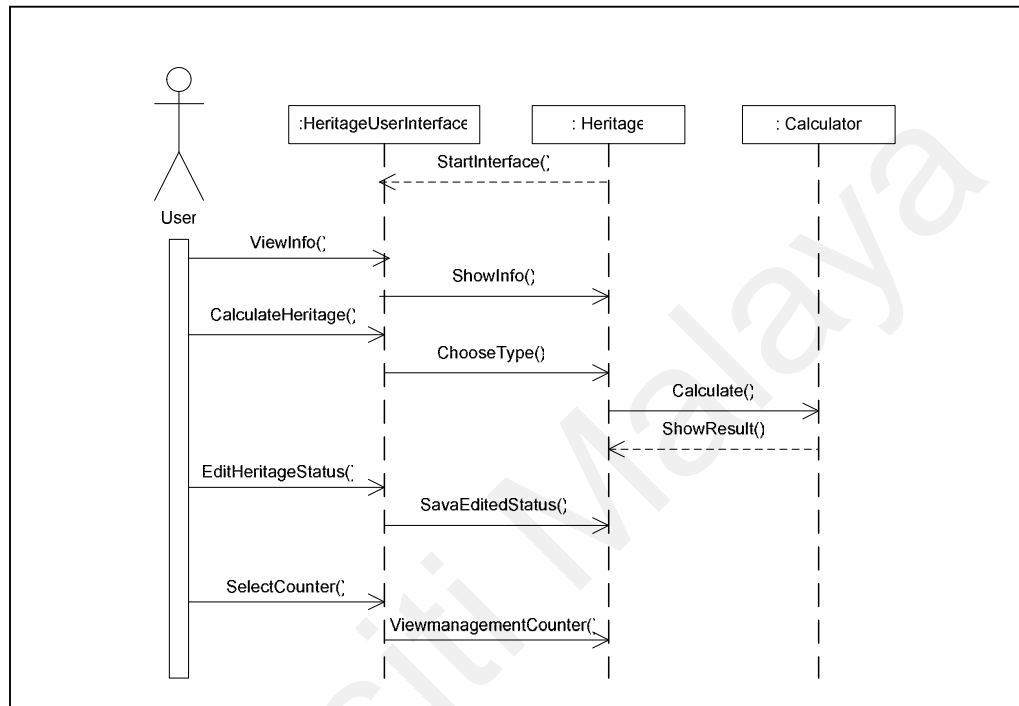
**Figure 5.30:** Sequence diagram for Archive module

Figure 5.31 shows the sequence diagram for zakat module. Zakat module can be accessed by registered user where they can view zakat information in detail, calculate zakat, edit zakat status and view zakat counter.



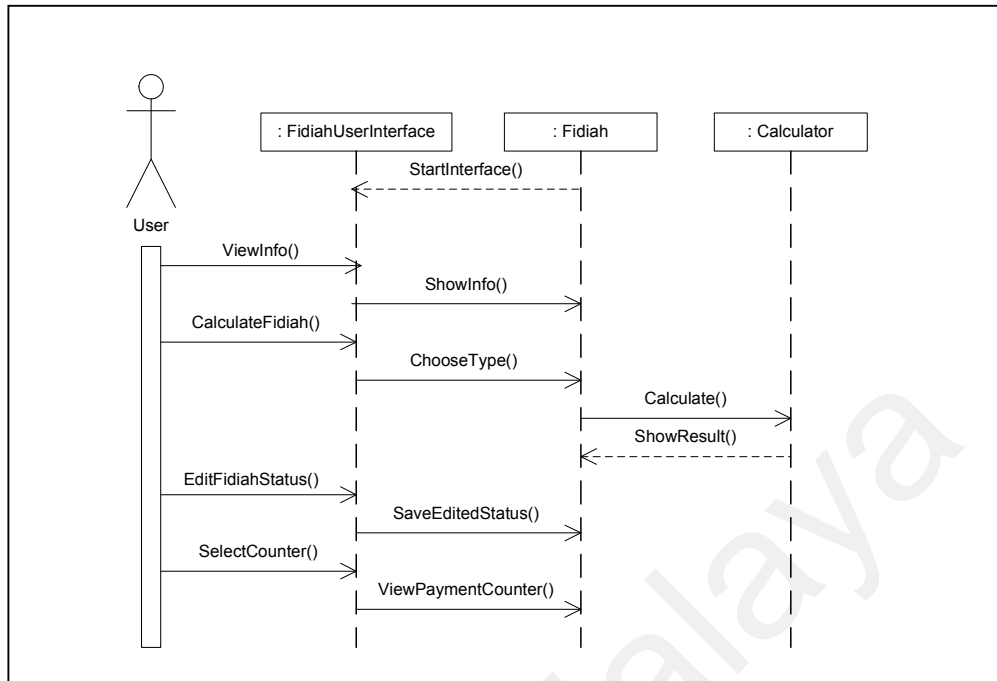
**Figure 5.31:** Sequence diagram for Zakat module

Figure 5.32 shows the sequence diagram for heritage module. Heritage module can be accessed by registered user where they can view heritage information in detail, calculate heritage, edit heritage status and view heritage counter.



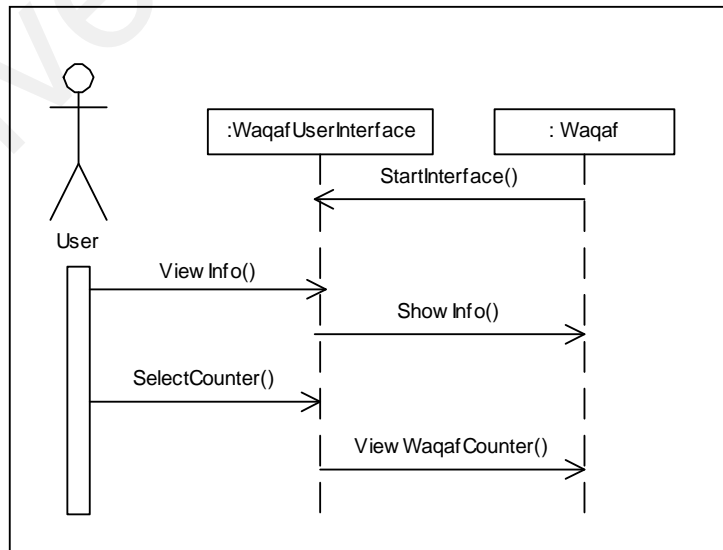
**Figure 5.32:** Sequence diagram for Heritage module

Figure 5.33 shows the sequence diagram for fidiah module. Fidiah module can be accessed by registered user where they can view fidiah information in detail, calculate fidiah, edit fidiah status and view fidiah counter.



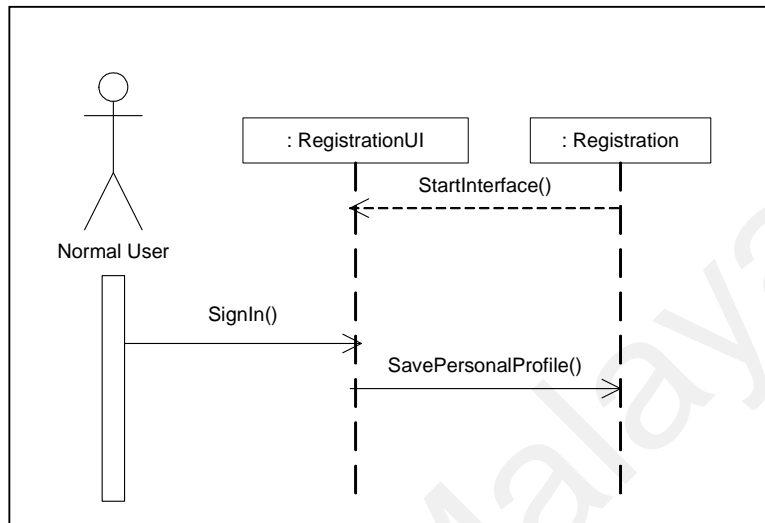
**Figure 5.33:** Sequence diagram for Fidiah module

Figure 5.34 shows the sequence diagram for waqaf module. Waqaf module can be accessed by registered user where they can view waqaf information in detail and view waqaf counter.



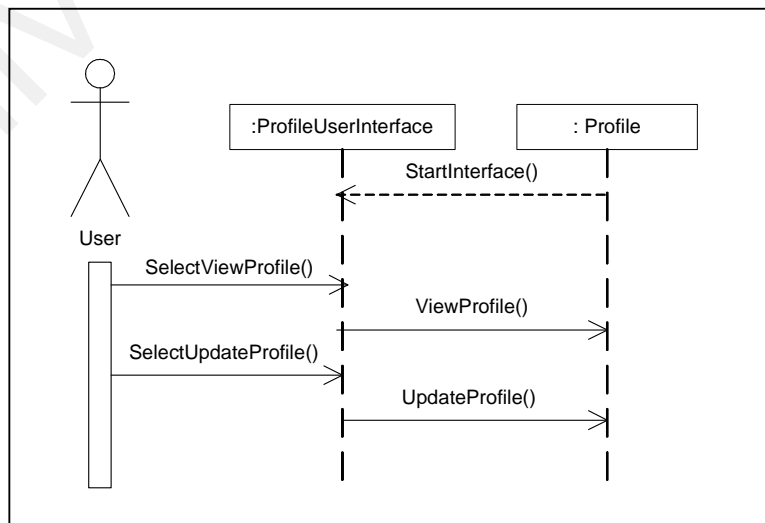
**Figure 5.34:** Sequence diagram for Waqaf module

Figure 5.35 shows the sequence diagram for registration module. Registration module can be accessed by normal user where they can register to the system.



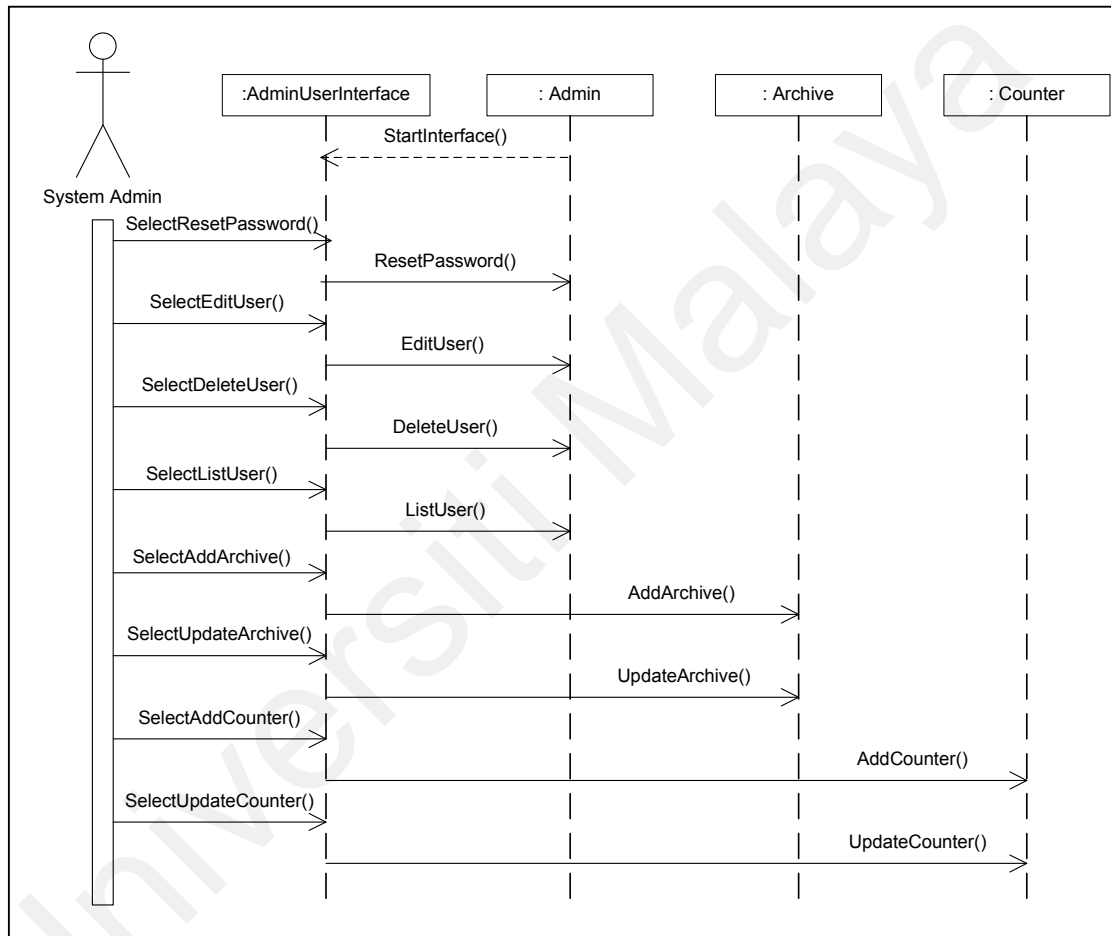
**Figure 5.35:** Sequence Diagram for Registration module

Figure 5.36 shows the sequence diagram for user profile module. User profile module can be accessed by registered user where they can view and update their profile.



**Figure 5.36:** Sequence Diagram for User Profile module

Figure 5.37 shows the sequence diagram for admin module. Admin module can be accessed only by system admin where they can reset user's password, edit user, edit archive and edit counter.

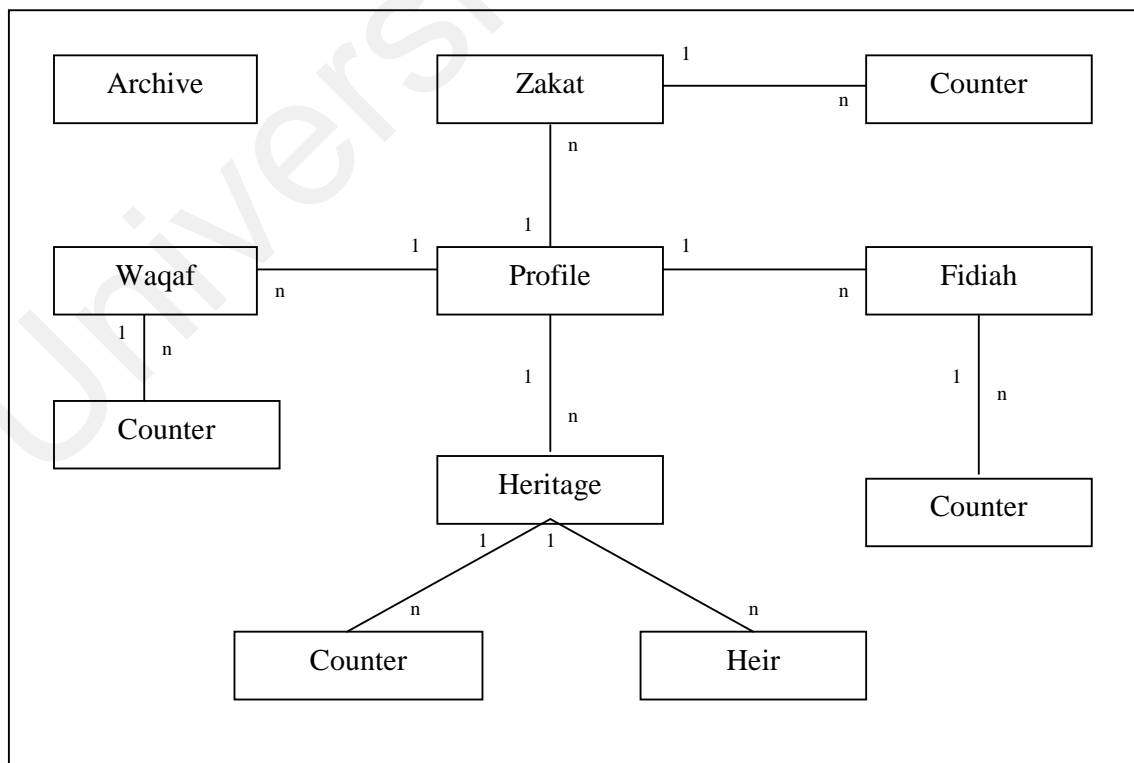


**Figure 5.37:** Sequence diagram for Admin module

## 5.3 Database Design

### 5.3.1 Entity Relationship Diagram

The Entity Relationship diagram provides a graphical presentation of the major data objects, the entities and the relationships of the data. The following is the table of each entity available in the system representing the data dictionary of the database system. Primary and foreign keys are the most basic components on which relational theory is based. Primary key enforce entity integrity by uniquely identifying entity instances. Foreign key enforce referential integrity by completing an association between two entities. The details description of the tables existed in Personal Islamic Asset Management System using Object-oriented Approach can be referred at Appendix C. An Entity Relationship Diagram of this system is shown in figure 5.38. It represents the relationship between entities in the diagram.



**Figure 5.38:** Entity Relationship Diagram

### 5.3.2 Connection to Database

The Personal Islamic Asset Management System using Object-oriented Approach used MySQL as its database. The connection between database and the system is using the 'mysql\_connect()' function that is provided in PHP programming. The function is as below:

```
<?php
$dbhost = 'localhost';
$dbuser = 'root';
$dbpass = 'password';

$conn = mysql_connect($dbhost, $dbuser, $dbpass) or die
('Error connecting to mysql');

$dbname = 'iams';
mysql_select_db($dbname);
?>
```

\$dbhost is the name of MySQL server but if the web server is on the same machine with MySQL server, localhost or 127.0.0.1 can be used as a value for \$dbhost. The \$dbuser and \$dbpass are valid MySQL username and password. &dbname is the database name. To select database, use 'mysql\_select\_db()' followed by the query statement. The connection opened in a script will be closed as soon as the execution of the script ends, but its better to close it explicitly by calling 'mysql\_close()' function.

## 5.4 System GUI

### 1. Main page.

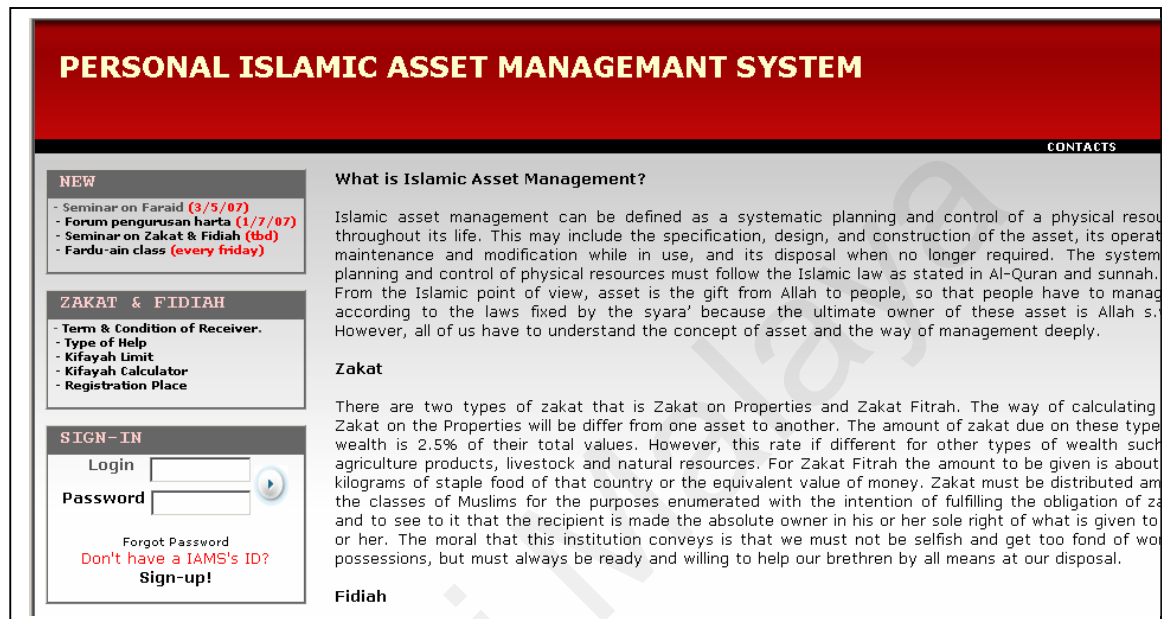


Figure 5.39: Main Page Screen

### 2. Forgot Password



Figure 5.40: Forgot Password Screen



### 3. Admin: Change Password

ISLAMIC ASSET MANAGEMENT SYSTEM

ADMIN PROFILE ARCHIVE ZAKAT FIDIAH HERITAGE WAQAF

ADMIN - Change Password

Please select user and enter new password.

IDST: Alvin Ahsan Arfa

New Password:

Repeat New Password:

Submit

User Password

All User

All Active

Figure 5.41: Change Password Screen for Admin Module

### 4. Admin: Edit User

ISLAMIC ASSET MANAGEMENT SYSTEM

ADMIN PROFILE ARCHIVE ZAKAT FIDIAH HERITAGE WAQAF

ADMIN - Edit User

Name	Gender	Email	Action
Alvin Ahsan Arfa	Female	alvin@alvin.com.my	update   delete
Rizka Shafiqi Raza	Male	rizka@alvin.com	update   delete
Rahma Nabila Raza	Female	rahma@alvin.com.my	update   delete
Mya Qalqa Mokhtar	Female	mya@alvin.com.my	update   delete
Mikal Mydin	Male	mikal@alvin.com	update   delete
Mona Saad Osman	Male	mona@alvin.com	update   delete

User Password

All User

All Active

Figure 5.42: Edit User Screen for Admin Module

5. Admin: Edit Archive



Figure 5.43: Edit Archive Screen for Admin Module

6. Profile: Change Password



Figure 5.44: Change Password Screen for Profile Module

## 7. Profile: View Profile



Figure 5.45: View Profile Screen for Profile Module

## 8. Profile: Edit Profile



Figure 5.46: Edit Profile Screen for Profile Module

## 9. Archive: Search Archive



Figure 5.47: Search Archive Screen for Archive Module

## 10. Zakat: Details Information



Figure 5.48: Details Information Screen for Zakat Module

## 11. Zakat: Income Calculator

The screenshot shows the 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM' interface. The main menu includes PROFILE, ARCHIVE, ZAKAT, FIDIAH, HERITAGE, WAQAF, and LOGOUT. The left sidebar contains links for Zakat Details, Zakat Calculator, Edit Zakat, and Zakat Counter. The main content area is titled 'ZAKAT - Income Calculator' and includes sub-links for Zakat on Income, Zakat on Saving, Zakat on Business, Zakat on EPF, Zakat on Share, and Zakat on G. The form prompts the user to 'Please enter the required information..' and is divided into two sections: A. YEARLY INCOME and B. YEARLY EXPENSES. Section A includes input fields for Salary, Allowance, Bonus, and Other Income, with a Total field showing 0. Section B includes input fields for Personal (RM8000) with the value 8000, Wife (RM3000) with a dropdown menu set to 'Bujang', and Children (1=RM1000) with a dropdown menu set to 'Tiada'. There is also a partially visible field for 'Spouse to Parents'.

Figure 5.49: Income Calculator Screen for Zakat Module

## 12. Zakat: Saving Calculator

The screenshot shows the 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM' interface. The main menu includes PROFILE, ARCHIVE, ZAKAT, FIDIAH, HERITAGE, WAQAF, and LOGOUT. The left sidebar contains links for Zakat Details, Zakat Calculator, Edit Zakat, and Zakat Counter. The main content area is titled 'ZAKAT - Saving Calculator' and includes sub-links for Zakat on Income, Zakat on Saving, Zakat on Business, Zakat on EPF, and Zakat on Share. The form prompts the user to 'Please enter the required information..' and is divided into two sections: A. SAVING IN ISLAMIC ACCOUNT and B. SAVING IN CONVENTIONAL ACCOUNT. Section A includes input fields for 'Lowest account balance' and 'Zakat'. Section B includes input fields for 'Lowest account balance', 'MINUS', and 'Interest', with a 'Balance after minus the interest' field showing 0 and a 'Zakat' field.

Figure 5.50: Saving Calculator for Zakat Module

### 13. Zakat: Business Calculator

**PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM**

PROFILE > ARCHIVE > ZAKAT > FIDIAH > HERITAGE > WAQAF > LOGOUT >

ZAKAT - Business Calculator    Zakat on Income    Zakat on Saving    Zakat on Business    Zakat on EPF    Zakat on Share    Zakat on Gold

Please enter the required information..

**A. NET CURRENT ASSET (Syariatyah Model)**

**ADJUSTMENT FOR ITEM IN CURRENT ASSET (DEDUCTED)**

**B. Item deducted due to 'incomplete ownership'**

Prepaid - Insurance, building assessments and road tax on vehicles :

Advances/Deposits - towards purchasing fixed assets :

Sundry Deposits - telephone, water, electricity, rent on building and project deposits :

Receivables on Al-Mustaghallat (productive) fixed assets :

Receivables from non current assets :

Financial Debtors :

Other Debtors :

**Figure 5.51:** Business Calculator Screen for Zakat Module

### 14. Zakat: EPF Calculator

**PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM**

PROFILE > ARCHIVE > ZAKAT > FIDIAH > HERITAGE > WAQAF > LOGOUT >

ZAKAT - EPF Calculator    Zakat on Income    Zakat on Saving    Zakat on Business    Zakat on EPF    Zakat on Share    Zakat on Gold

Please enter the required information..

Amount of monet during withdrawal :

Amount of Zakat :

Reset    Calculate    Save

**Figure 5.52:** EPF Calculator Screen for Zakat Module

15. Zakat: Share Calculator

The screenshot shows the 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM' interface. The top navigation bar includes 'PROFILE', 'ARCHIVE', 'ZAKAT', 'FIDIAH', 'HERITAGE', 'WAQAF', and 'LOGOUT'. The 'ZAKAT' section is active, with sub-links for 'Zakat on Income', 'Zakat on Saving', 'Zakat on Business', 'Zakat on EPF', 'Zakat on Share', and 'Zakat on Gold & Silver'. The 'Zakat on Share' link is selected. The main content area is titled 'ZAKAT -Share Calculator' and contains a form with the following fields:

- A. SHARE**
  - Lowest price of the year :
  - Amount of Zakat :
- B. SHARE THAT HAS BEEN TRADE THROUGH OUT THE YEAR**
  - Total share selling price :
  - MINUS
  - Share buying price :
  - Balance after minus the buying price :
  - Amount of Zakat :

Figure 5.53: Share Calculator Screen for Zakat Module

16. Zakat: Gold & Silver Calculator

The screenshot shows the 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM' interface. The top navigation bar includes 'PROFILE', 'ARCHIVE', 'ZAKAT', 'FIDIAH', 'HERITAGE', 'WAQAF', and 'LOGOUT'. The 'ZAKAT' section is active, with sub-links for 'Zakat on Income', 'Zakat on Saving', 'Zakat on Business', 'Zakat on EPF', 'Zakat on Share', and 'Zakat on Gold & Silver'. The 'Zakat on Gold & Silver' link is selected. The main content area is titled 'ZAKAT -Gold & Silver Calculator' and contains a form with the following fields:

- A. GOLD (Jewellery)**
  - Gold weight (gram) :
  - Price per gram :
  - Total gold price :
  - Zakat :
- B. GOLD (Saving)**
  - Gold weight (gram) :
  - Price per gram :
  - Total gold price :

Figure 5.54: Gold & Silver Calculator Screen for Zakat Module

17. Zakat : Edit Status

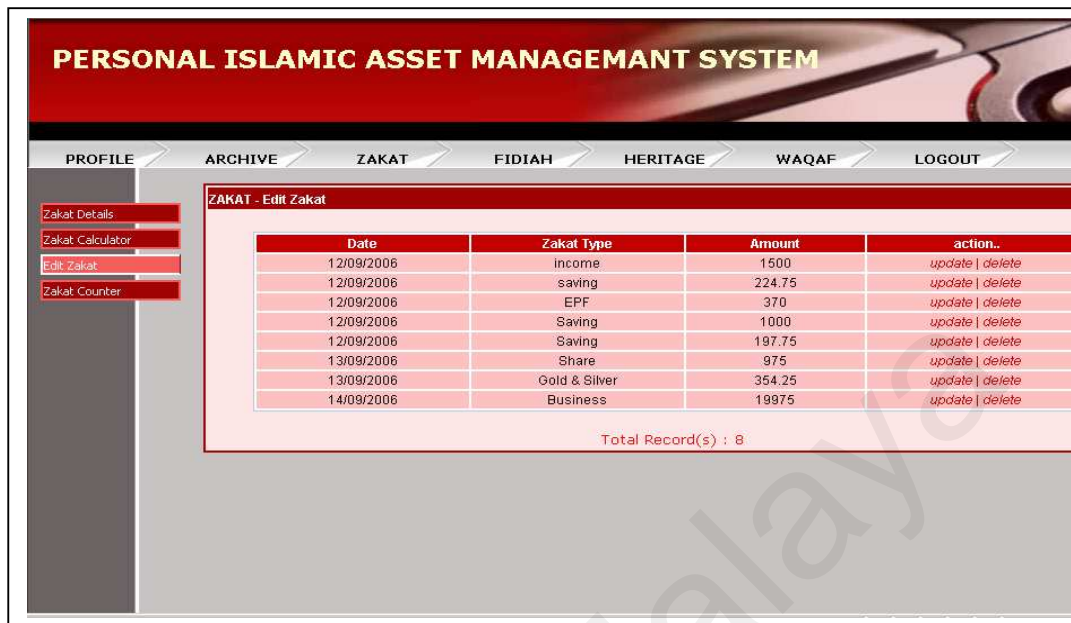


Figure 5.55: Edit Status Screen for Zakat Module

18. Zakat: Counter

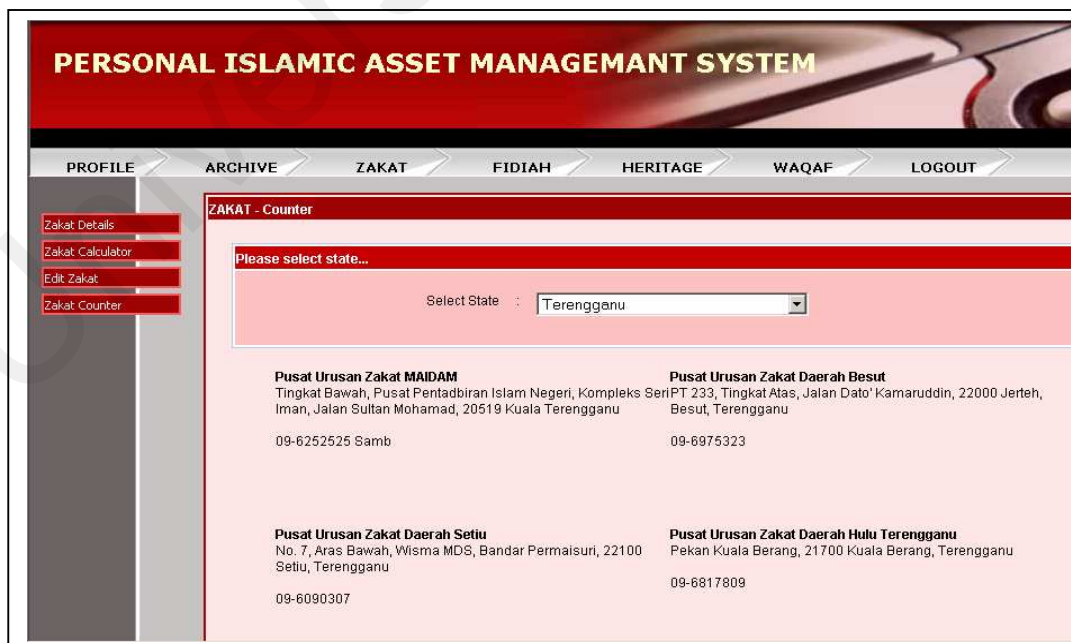


Figure 5.56: Zakat Counter Screen for Zakat Module



## 19. Fidiah: Details Information

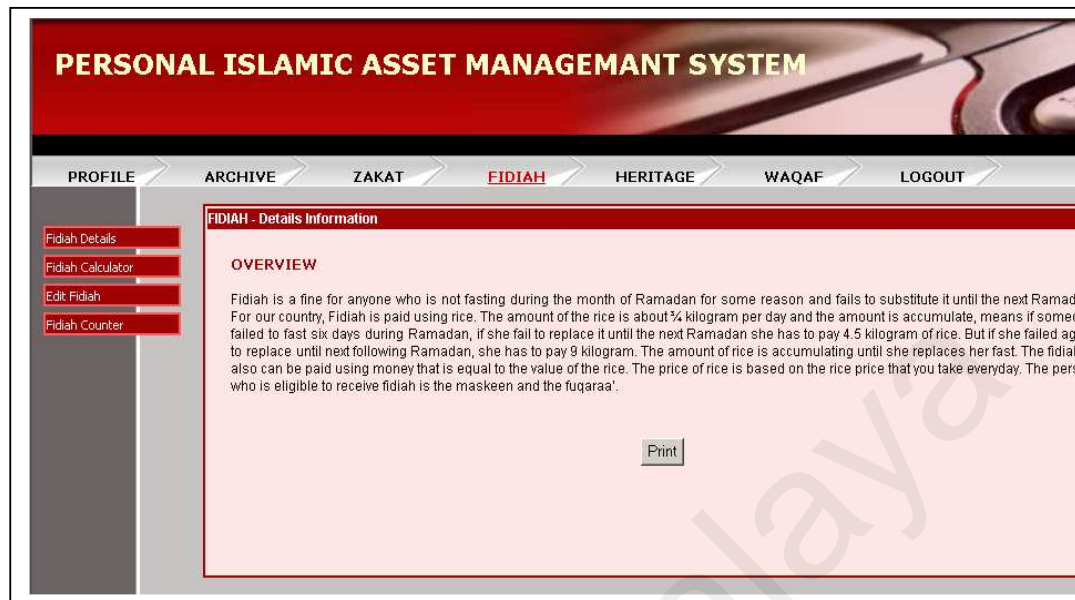


Figure 5.57: Details Information Screen for Fidiah Module

## 20. Fidiah: Calculator (payment mode: money)

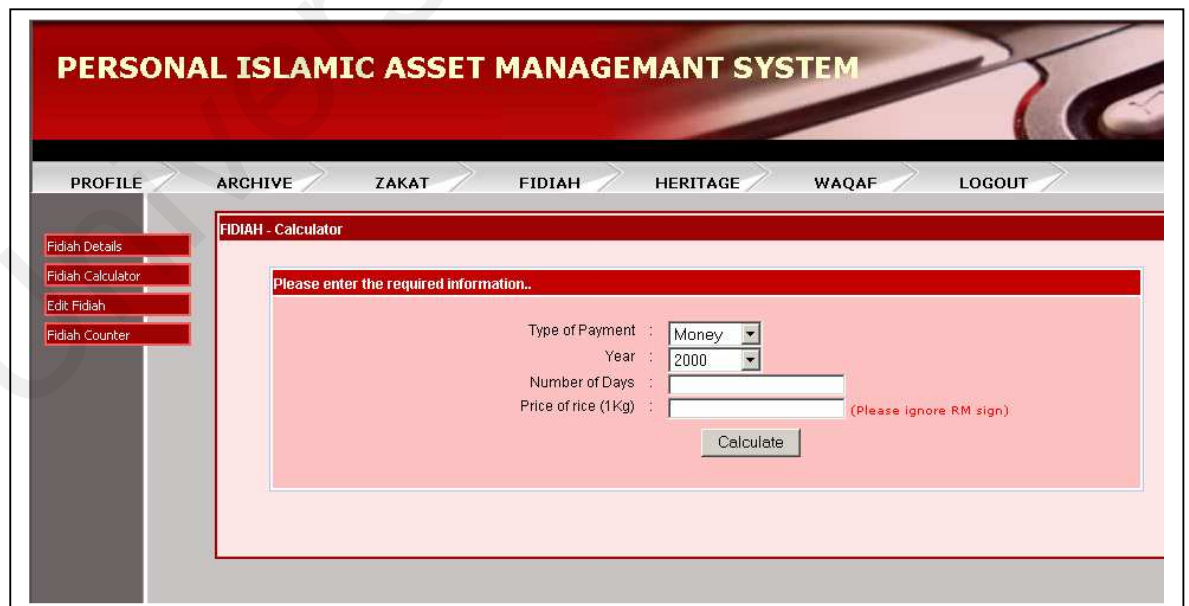


Figure 5.58: Money Calculator Screen for Fidiah Module

21. Fidiah: Calculator (payment mode: rice)

The screenshot shows the 'FIDIAH - Calculator' screen. The header is 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM'. The navigation menu includes PROFILE, ARCHIVE, ZAKAT, FIDIAH, HERITAGE, WAQAF, and LOGOUT. The left sidebar has links for Fidiah Details, Fidiah Calculator, Edit Fidiah, and Fidiah Counter. The main content area is titled 'FIDIAH - Calculator' and contains a form with the following fields:

- Type of Payment : Rice (dropdown menu)
- Year : 2000 (dropdown menu)
- Number of Days : (text input field)
- Calculate (button)

The form is enclosed in a red border with the text 'Please enter the required information..' at the top.

Figure 5.59: Rice Calculator Screen for Fidiah Module

22. Fidiah: Edit Status

The screenshot shows the 'FIDIAH - Edit Fidiah' screen. The header is 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM'. The navigation menu includes PROFILE, ARCHIVE, ZAKAT, FIDIAH, HERITAGE, WAQAF, and LOGOUT. The left sidebar has links for Fidiah Details, Fidiah Calculator, Edit Fidiah, and Fidiah Counter. The main content area is titled 'FIDIAH - Edit Fidiah' and contains a table with the following data:

Date	Type	Year	Number of Days	action..
17/08/2006	Rice	2000	2	<a href="#">update</a>   <a href="#">delete</a>
17/08/2006	Money	2003	2	<a href="#">update</a>   <a href="#">delete</a>
12/09/2006	Rice	2001	6	<a href="#">update</a>   <a href="#">delete</a>

Below the table, it says 'Total Record(s) : 3'.

Figure 5.60: Edit Status Screen for Fidiah Module

## 23. Fidiah: Counter

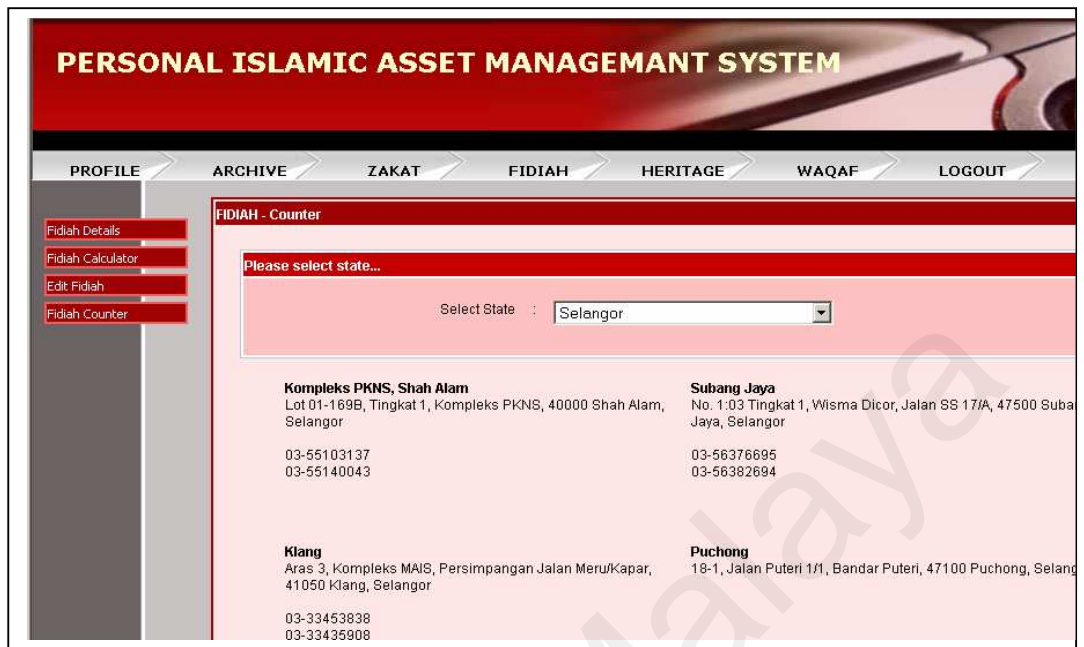


Figure 5.61: Fidiah Counter Screen for Fidiah Module

## 24. Heritage: Details Information

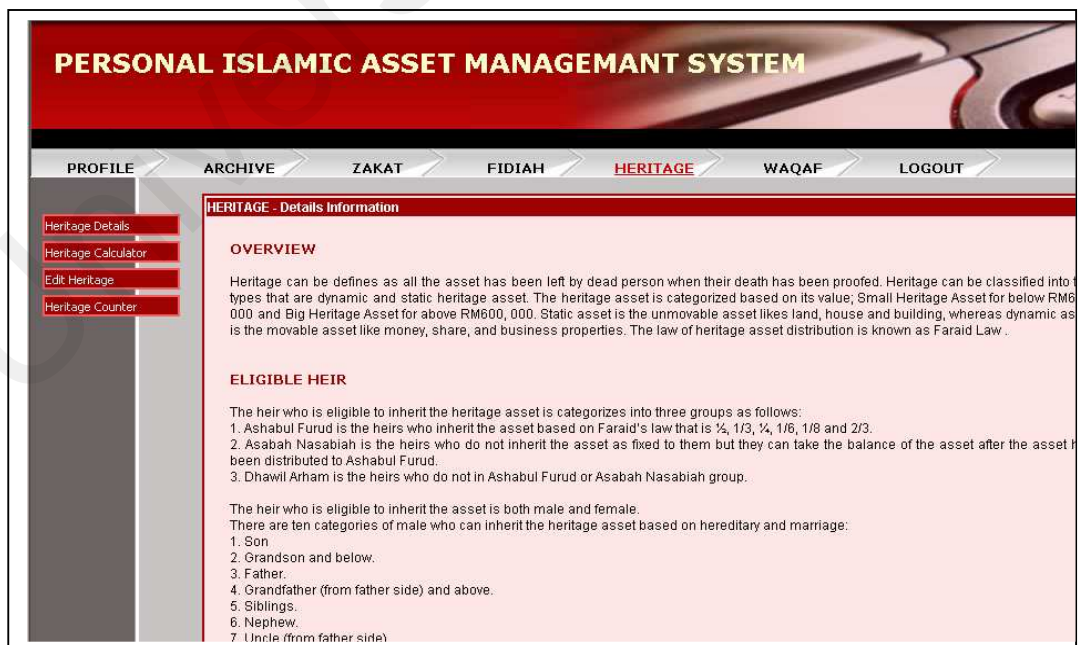


Figure 5.62: Details Information Screen for Heritage Module

25. Heritage: Calculator

Figure 5.63: Calculator Screen for Heritage Module

26. Heritage: Edit Status

Date	action..
06/02/2007	update   delete

Total Record(s) : 1

Figure 5.64: Edit Status Screen for Heritage Module

## 27. Heritage: Counter



Figure 5.65: Heritage Counter Screen for Heritage Module

## 28. Waqaf: Details Information



Figure 5.66: Details Information Screen for Waqaf Module

## 29. Waqaf: Counter



**Figure 5.67:** Waqaf Counter Screen for Waqaf Module

## 5.5 Conclusion

This chapter discussed on system design, which emphasized on the design of the system. The system design described the system design and modeling, database design and system interface. UML methodology is used in system design and modeling to design and model the system that consists of layered architecture, class diagram and sequence diagram. Database has been designed using entity relationship diagram. Each screen of the system has been captured in system interface. The implementation of the system will be discussed in the next chapter.

## **Chapter 6**

### **Implementation**

#### **6.1 Introduction**

This chapter describes the implementation Personal Islamic Asset Management System using Object-oriented Approach. The implementation chapter elaborates about the functionality of the system based on classes and methods. The Implementation chapter also explained about the execution of main module in the system. As applying the Rational Unified Process (RUP) model in developing the system, this chapter maps with the construction phase of the model. In construction phase the main focus goes to the development of components and other features of the system. This is the phase where the bulk of the coding takes place. This phase produces the first external release of the software.

#### **6.2 Implementation**

System implementation is the practical application of a methodology or algorithm to fulfill a desired purpose. Once the implementation phase of Personal Islamic asset

Management System using Object-oriented Approach is completed, the system can function as listed in section 6.2.1 below

### 6.2.1 System Functionality

The functionality of the Personal Islamic Asset Management System using Object-oriented Approach is described in detailed in table 6.1 below.

**Table 6.1:** System Functionality

No	Class	Method	Description
1.	General Info	a) DisplayGeneralInfo()	<ul style="list-style-type: none"> <li>Display the brief information about Islamic asset and Islamic asset management.</li> </ul>
		b) DisplayKifayahInfo()	<ul style="list-style-type: none"> <li>Display detail information about kifayah infoformation including its limit, type of help, term and condition of receiver and registration place.</li> </ul>
2.	Kifayah Calculator	a) CalculateKifayah()	<ul style="list-style-type: none"> <li>Calculate kifayah by providing all the needed data then system will calculate the result to decide whether in which <i>maskeen</i> or <i>fuqafaa'</i> category.</li> </ul>



**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
3.	Register	a) RegisterUser()	<ul style="list-style-type: none"> <li>• Registration process of new user is done in register class using RegisterUser() method.</li> <li>• It saves id, password, fullname, address, email, phoneNo, nationality and dateofbirth attributes in the system database.</li> <li>• The password entered by user is encrypted before saves it into database</li> <li>• Once the registration processes succeed, the user will be notified by email.</li> </ul>
4.	Registered User	a) ForgotPassword()	<ul style="list-style-type: none"> <li>• If the registered users forgot their password, there is a method in the system to retrieve password. User need to give their “LoginID” in order to retrieve the password, then the password will be sent via email</li> </ul>
		b) SearchArchive()	<ul style="list-style-type: none"> <li>• This is a method in the system to allow only registered user to search archive.</li> </ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
		c) ManageZakat()	<ul style="list-style-type: none"> <li>There is a method to allow only registered user to manage their zakat in the system</li> </ul>
		d) ManageFidiah()	<ul style="list-style-type: none"> <li>There is a method to allow only registered user to manage their fidiah in the system</li> </ul>
		e) ManageHeritage()	<ul style="list-style-type: none"> <li>There is a method to allow only registered user to manage their heritage in the system</li> </ul>
		f) ManageWaqaf()	<ul style="list-style-type: none"> <li>There is a method to allow only registered user to manage their waqaf in the system</li> </ul>
5.	Personal Profile	a) ChangePassword()	<ul style="list-style-type: none"> <li>There is a method in the system to allow the registered users to change their password in personal profile class.</li> <li>To change Users have to enter the current password and the new password they wish to use, then the system will replace the current password with the new password.</li> </ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
		b) EditProfile()	<ul style="list-style-type: none"><li>• There is a method in personal profile class to allow registered users edit their own profiles.</li></ul>
		c) ViewProfile()	<ul style="list-style-type: none"><li>• There is a method in personal profile class to allow registered users view their own profiles.</li></ul>
6.	System Admin	a) ResetPassword()	<ul style="list-style-type: none"><li>• There is a method in system admin class to allow system admin to reset the users' password to default password if such request from the user itself.</li></ul>
		b) EditUser()	<ul style="list-style-type: none"><li>• There is a method in system admin class to allow system admin edit the users' data.</li><li>• To edit the user data, system admin have to select the user name from the list.</li><li>• Then the current data about that user is displayed in the text box. The data can be edited by updating the data in the text box.</li><li>• If the system admin is confirmed to edit the data, it will be permanently updated at the database.</li></ul>

**Table 6.1:** System Functionality (cont.)

No	Class	Method	Description
		c) EditArchive()	<ul style="list-style-type: none"><li>• There is a method in system admin class to allow system admin edit archive data.</li><li>• Add new file into the system archive database.</li><li>• System admin has to insert the require data at the specific column in the system archive form.</li><li>• To update the file in the system archive, system admin have to select the file from the list.</li><li>• Then the detail data about that file is displayed.</li><li>• If the system admin is confirmed to update or delete the data, it will be permanently updated or deleted at the database.</li></ul>

**Table 6.1:** System Functionality (cont.)

No	Class	Method	Description
		d) AddCounter()	<ul style="list-style-type: none"><li>• There is a method in system admin class to allow system admin add new zakat, fidiah, heritage or waqaf counter.</li><li>• Administrator has to insert the required data at the specific column in the system archive form.</li><li>• To update the counter, system admin have to select the counter name from the list.</li><li>• Then the detail data about that file is displayed.</li><li>• If the system admin is confirmed to update or delete the data, it will be permanently updated or deleted at the database.</li></ul>
7.	Zakat	a) ViewDetailInfo().	<ul style="list-style-type: none"><li>• There is a method in zakat class to allow registered users view detail information of zakat.</li></ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
		b) EditZakat()	<ul style="list-style-type: none"> <li>• Zakat has id, LoginID, ZakatDate, ZakatType, ZakatAmount and ZakatStatus attributes.</li> <li>• There is a method in zakat class to allow registered users to edit their calculated zakat status.</li> <li>• To view the calculated data users have to double click on the value.</li> <li>• To edit the calculated data users have to click 'update' and update the status.</li> <li>• To delete the calculated data, users have to click 'Delete' button.</li> </ul>
8.	Zakat Counter	a) SearchCounter()	<ul style="list-style-type: none"> <li>• There is a method in zakat counter class to allow registered users to search zakat counter</li> <li>• To search zakat counter, registered users need to select the state from the list.</li> <li>• Zakat counter class has CounterName, Address, Email, PhoneNo, FaxNo, ContactPerson and state attributes.</li> </ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
		b) ViewCounter()	<ul style="list-style-type: none"> <li>• There is a method in zakat counter class to allow registered users to view zakat counter after the search operation has been done, the matched zakat counter will be displayed.</li> </ul>
9.	Zakat Calculator	a) CalculateZakat()	<ul style="list-style-type: none"> <li>• There is a method in zakat calculator class to allow registered users to calculate their zakat.</li> <li>• To calculate zakat, user has to select the zakat type.</li> <li>• Enter the value of asset and click 'Calculate' button and value will be displayed.</li> <li>• Click 'Save' button to save the calculated value.</li> <li>• With reference to example in chapter 2, section 2.3.3.1, the calculation of zakat on saving is as below:               <p style="text-align: right;">[Saving] RM 25 000.00</p> <p>(minus) [Interest 8%] RM 2000.00</p> <p style="text-align: right;">[Value for zakat] RM 23 000.00</p> <p>[Zakat amount] = RM 23 000 X 2.5%</p> <p style="text-align: right;">= RM 575.00</p> </li> </ul>

**Table 6.1:** System Functionality (cont.)

No	Class	Method	Description
10.	Fidiah	a) ViewDetailInfo()	<ul style="list-style-type: none"><li>• There is a method in fidiah class to allow registered users view detail information of fidiah.</li></ul>
		b) EditFidiah()	<ul style="list-style-type: none"><li>• Fidiah has id, LoginID, FidiahDate, FidiahAmount and FidiahStatus attributes.</li><li>• There is a method in fidiah class to allow registered users to edit their calculated fidiah status.</li><li>• To view the calculated data users have to double click on the value.</li><li>• To edit the calculated data users have to click 'update' and update the status.</li><li>• To delete the calculated data, users have to click 'Delete' button.</li></ul>



**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
11.	Fidiah Counter	a) SearchCounter()	<ul style="list-style-type: none"> <li>• There is a method in fidiah counter class to allow registered users to search fidiah counter</li> <li>• To search fidiah counter, registered users need to select the state from the list.</li> <li>• Fidiah counter class has CounterName, Address, Email, PhoneNo, FaxNo, ContactPerson and state attributes.</li> </ul>
		b) ViewCounter()	<ul style="list-style-type: none"> <li>• There is a method in fidiah counter class to allow registered users to view fidiah counter</li> <li>• After the search operation has been done, the matched fidiah counter will be displayed.</li> </ul>
12.	Fidiah calculator	a) CalculateFidiah()	<ul style="list-style-type: none"> <li>• There is a method in fidiah calculator class to allow registered users to calculate their fidiah.</li> <li>• To calculate fidiah, user has to select mode of payment and enter the number of day.</li> <li>• The fidiah value will be displayed.</li> </ul>

**Table 6.1:** System Functionality (cont.)

No	Class	Method	Description
			<ul style="list-style-type: none"> <li>• Click 'Save' button to save the calculated value.</li> <li>• With reference to example in chapter 2, section 2.3.3.2, the calculation of fidiah is as below:            Number of days = 6            Amount of rice per day = <math>\frac{3}{4}</math> kg            Fidiah for one year = <math>6 \times \frac{3}{4} = 4.5\text{kg}</math></li> <li>• If she failed to replace her fast until the following years, the amount of fidiah will be accumulated. Fidiah for two years will be 9kg, 3 years will be 13.5kg and so on. If she want to pay fidiah using money, she must pay the equivalent price of the rice</li> </ul>
13.	Waqaf	a) ViewDetailInfo()	<ul style="list-style-type: none"> <li>• There is a method in waqaf class to allow registered users to view detailed information of waqaf.</li> </ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
14.	Waqaf Counter	a) SearchCounter()	<ul style="list-style-type: none"><li>• There is a method in waqaf counter class to allow registered users to search waqaf counter</li><li>• To search waqaf counter, registered users need to select the state from the list.</li><li>• Waqaf counter class has CounterName, Address, Email, PhoneNo, FaxNo, ContactPerson and state attributes.</li></ul>
		b) ViewCounter()	<ul style="list-style-type: none"><li>• There is a method in waqaf counter class to allow registered users to view waqaf counter</li><li>• After the search operation has been done, the matched waqaf counter will be displayed.</li></ul>
15.	Heritage	a) ViewDetailInfo()	<ul style="list-style-type: none"><li>• There is a method in heritage class to allow registered users view detail information of heritage.</li></ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
		b) EditHeritage()	<ul style="list-style-type: none"> <li>• Heritage has id, LoginID, HeritageDate, HeirID, fraction and HeritageStatus attributes.</li> <li>• There is a method in heritage class to allow registered users to edit their calculated heritage status.</li> <li>• To view the calculated data users have to double click on the value.</li> <li>• To edit the calculated data users have to click 'update' and update the status.</li> <li>• To delete the calculated data, users have to click 'Delete' button.</li> </ul>
16.	Heritage Counter	a) SearchCounter()	<ul style="list-style-type: none"> <li>• There is a method in heritage counter class to allow registered users to search heritage counter</li> <li>• To search heritage counter, registered users need to select the state from the list.</li> <li>• Heritage counter class has CounterName, Address, Email, PhoneNo, FaxNo, ContactPerson and state attributes.</li> </ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
		b) ViewCounter()	<ul style="list-style-type: none"><li>• There is a method in heritage counter class to allow registered users to view heritage counter</li><li>• After the search operation has been done, the matched heritage counter will be displayed.</li></ul>
17.	Heritage Calculator	a) CalculateHeritage()	<ul style="list-style-type: none"><li>• There is a method in heritage calculator class to allow registered users to calculate their heritage.</li><li>• To calculate the heritage, user has to select the heirs.</li><li>• Click 'calculate' button, the system will show the amount in fraction for each heirs.</li><li>• Click 'Save' button to save the calculated value</li><li>• With reference to example in chapter 2, section 2.3.3.3, the calculation of heritage is as below:</li></ul>

**Table 6.1: System Functionality (cont.)**

No	Class	Method	Description
			<p>1 Wife = <math>1/8</math></p> <p>2 Sons = 2 portions each from remaining asset.</p> <p>1 daughter = 1 portion from remaining asset.</p> <p>Minus portion for wife first,</p> $1 - 1/8 = 7/8.$ <p>From <math>7/8</math>, it has to divide to 5 portions (4 portions for 2 sons and 1 portion for 1 daughter):</p> $1 \text{ portion} = 7/8 \times 1/5 = 7/40$ <p>Portion for each heir is as below:</p> <p>1 Wife = <math>5/40</math></p> <p>2 Sons = <math>28/40</math> (<math>14/40</math> for each son).</p> <p>1 Daughter = <math>7/40</math>.</p>
18.	Archive	a) ViewArchive()	<ul style="list-style-type: none"> <li>• There is a method in the archive class to allow registered user view the archive.</li> <li>• To view archive users have to search archive by keyword and the match document will be displayed.</li> <li>• Archive class has ID, filename and date attributes.</li> </ul>

### 6.3 System Environment

The Personal Islamic Asset management System using Object-oriented Approach was tested and able to run under windows and Linux environments. For client, since the system is web-based application, it is able to be opened from any environment as long as there is an Internet connection and a web browser. This system is supported by Internet Explorer, Mozilla, Firefox, Netscape Navigator and Opera web browsers. Table 6.2 below described the minimum requirement of the system environment for the server.

**Table 6.2:** System Environment for server

Computer/Processor	133 MHz or higher Pentium-compatible CPU.
Memory	At least 128 megabytes (MB) of RAM; more memory generally improves responsiveness.
Hard Disk	3 GB with 1 GB free space.
CPU Support	Windows 2000/XP or Linux
Web Server	Apache
Database	MySQL
Drive	CD-ROM or DVD drives.
Display	VGA or higher resolution monitor.
Keyboard	Required.
Mouse	Required.
Network Port	Required. At least with 10/100 Base T.

## 6.4 Output Sample

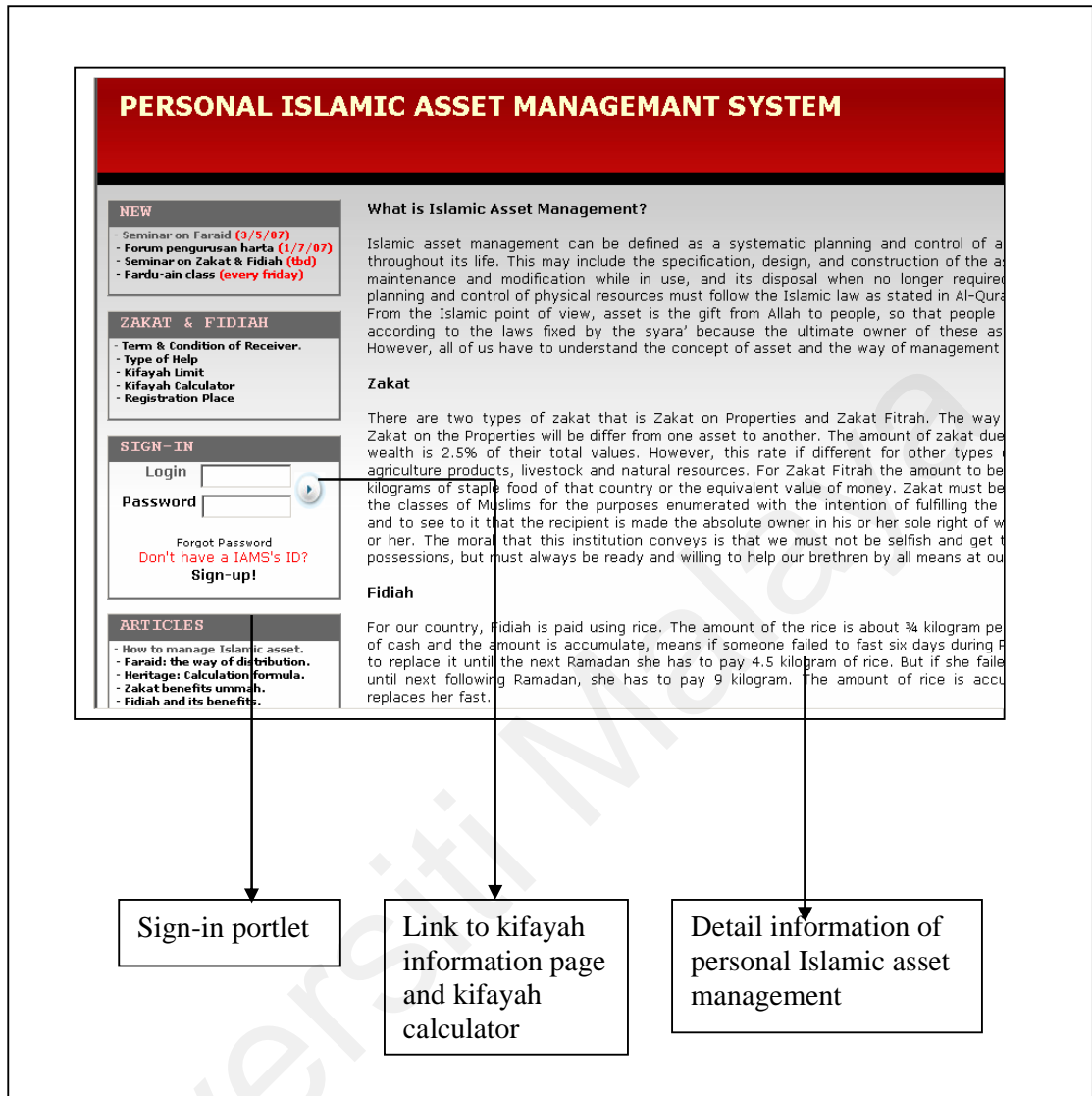
Personal Islamic Asset Management System using Object-oriented Approach consists of eight modules including general Information (main page). Below is the executing of main module of Personal Islamic Asset management System using Object-oriented Approach from the user point of view. The detailed operation of each module will be explained in user manual.

The address to the system is <http://'hostname'/IAMS/main.php>. The system can be accessed using the web browser as explained in the previous topic.

### 6.4.1 General Information

The main page of the system is the general information module. This module can be accessed by all users. From this module, user can read and print the detail information of personal Islamic asset management, read the detail information of kifayah, calculate kifayah, register as a user and login to the system. Only users with login ID and password can login to the system. In order to get the login ID and password, users have to register to the system. Figure 6.1 shows the general information page.





**Figure 6.1:** General information page

Figure 6.2 shows the kifayah information page and figure 6.3 shows the kifayah calculator.

**Kifayah Limit**

**What is Kifayah Limit?**

Kifayah limit is a 'line of basic need' for an individu or family. In this contexts, kifayah limit refers to a line or limit of minimum basic needs that is set by our country based on the present living cost. To set the kifayah limit, evaluation has been made cover up six aspect that is food, cloth, medical, education, transportation and housing.

**Category**

Each person in the house will have the different needs, so they have been categorized based on family level. Below are the categories with its description.

Category	Definition
Family leader	- Father/Mother or - Single mother or - Individual (alone) or - Person who responsible to the family.
Adult	- Husband/wife if has been bear by family leader is either working or not - Parents who is under responsibility - Person under responsibility or child who is finished their study and age more than 15 years old. - Person under responsibility or child who is already working but stay together.
Adult(Study)	- Person under responsibility or child aged more than 17.
Teenager(Study)	- Person under responsibility or child aged 13 to 17 and still study.
Children(Study)	- Person under responsibility or child aged 7 to 12 and still study. or - Person under responsibility or child aged 5 to 6 and still study.

**Figure 6.2:** Kifayah Information Page.

**Kifayah Limit Calculator**

Please enter the required information..

Location :

**URBAN CALCULATOR**

Name :

IC Number :

Address :

Household Income :

**Monthly Expenses:**

Family Leader  
 - Free house

- Rented house

Number of Adult(not study)

Number of Adult(study)

Number of Teenager(study)

Number of Children(study)

Number of Children(not study)

**Additional:**

Number of special child

**Figure 6.3:** Kifayah Calculator

## 6.4.2 Admin Module

The main function of admin module is to edit the user's information. Only system admin can access this module. From this module, system admin can update and delete the user's information based on the situation. To update user's data, click on 'update' link then the system will update the user's data and to delete the user, click on 'delete' then the system will permanently delete the user. Figure 6.4 shows the edit user page, whereas figure 6.5 shows the update user page and figure 6.6 shows the delete user page.

**PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM**

ADMIN PROFILE ARCHIVE ZAKAT FIDIAH HERITAGE WAQAF LOGOUT

ADMIN - Edit User

Name	Gender	Email	action..
Fazlina Iryani Abdul Hamid	Female	faz@abc.com.my	<a href="#">update</a>   <a href="#">delete</a>
iryani	Female	fazlina@meganet.com.my	<a href="#">update</a>   <a href="#">delete</a>
Rahayu	Male	fazlina@tmmd.com.my	<a href="#">update</a>   <a href="#">delete</a>

Total Record(s) : 3

Link to update data

Link to delete data

**Figure 6.4:** Edit User Page

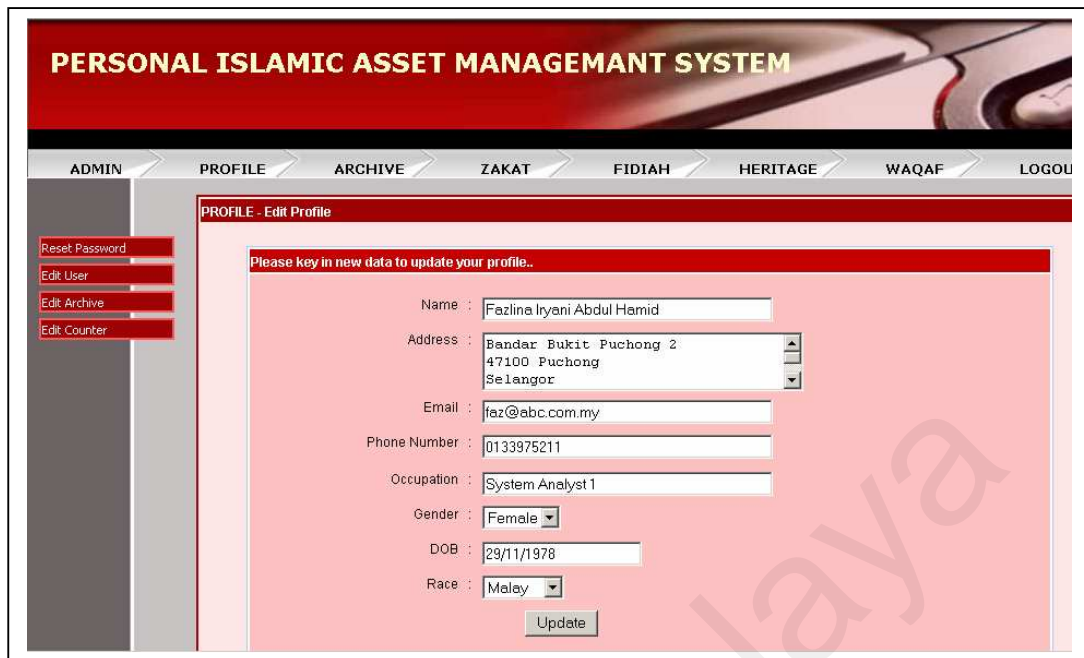


Figure 6.5: Update User



Figure 6.6: Delete User

### 6.4.3 Profile Module

The main function of profile module is for user to update their own information. Users can only access and edit their own profile. To edit profile, users just need to update their information in the specific column and click 'update' button then system will update the edited information. Figure 6.7 shows the update profile page.

The screenshot displays the 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM' interface. The main navigation bar includes 'PROFILE', 'ARCHIVE', 'ZAKAT', 'FIDIAH', 'HERITAGE', 'WAQAF', and 'LOGOUT'. The left sidebar contains 'Change Password', 'View Profile', and 'Edit Profile' options. The 'PROFILE - Edit Profile' section features a form with the following fields:

- Name : Fazlina Iyani Abdul Hemid
- Address : Bandar Bukit Puchong 2, 47100 Puchong, Selangor
- Email : faz@abc.com.my
- Phone Number : 0133975211
- Occupation : System Analyst 1
- Gender : Female
- DOB : 29/11/1978
- Race : Maley

An 'Update' button is located at the bottom of the form. A callout box on the right side of the form indicates 'Update the data in these columns', and another callout box below the 'Update' button states 'Click on 'update' button to update the profile'.

Figure 6.7: Edit Profile Page

#### 6.4.4 Archive Module

The main function of archive module is to search and open the file in system archive. Registered users can access this page. To search the file, key-in the key word in the search box and click 'search' button. System will find the archived file that match the key word entered and display the matched files. Figure 6.8 shows the archive page.

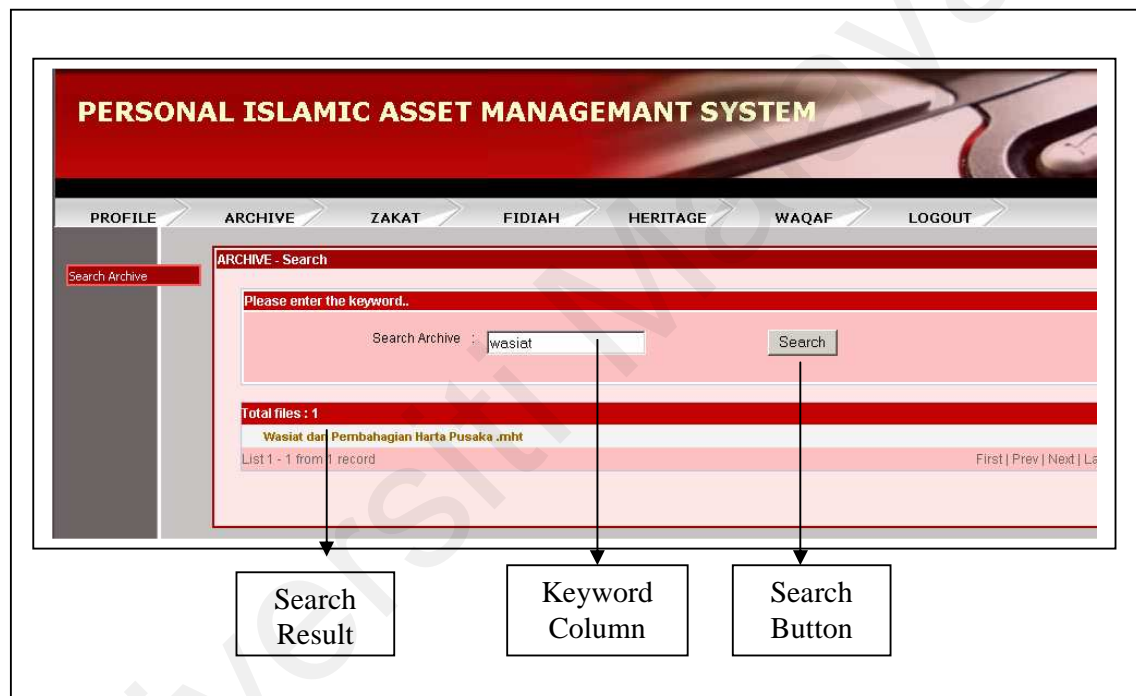


Figure 6.8: Archive page

#### 6.4.5 Zakat Module

The main function of zakat module is to calculate zakat. Zakat is divided into six categories, which is zakat on income, zakat on business, zakat on share, zakat on saving, zakat on gold and silver and zakat on EPF. Only registered users can access this page. To calculate zakat, fill in the required data and click 'calculate' button. Then system

will calculate the zakat that should be paid by the user. Figure 6.9 shows the zakat on income calculation page.

The screenshot displays the 'PERSONAL ISLAMIC ASSET MANAGEMENT SYSTEM' interface. The top navigation bar includes 'PROFILE', 'ARCHIVE', 'ZAKAT', 'FIDIAH', 'HERITAGE', 'WAQAF', and 'LOGOUT'. The 'ZAKAT' section is active, showing sub-options: 'Zakat on Income', 'Zakat on Saving', 'Zakat on Business', 'Zakat on EPF', 'Zakat on Share', and 'Zakat on Gold&S'. The left sidebar contains 'Zakat Details', 'Zakat Calculator', 'Edit Zakat', and 'Zakat Counter'. The main content area is titled 'Please enter the required information..' and contains two sections: 'A. YEARLY INCOME' and 'B. YEARLY EXPENSES'. Section A includes input fields for 'Salary', 'Allowance', 'Bonus', and 'Other Income', with a 'Total' field showing '0'. Section B includes input fields for 'Personal (RM8000)' (value: 8000), 'Wife (RM3000)' (dropdown: Bujang), 'Children (1=RM1000)' (dropdown: Tiada), and 'Giving to Parents'.

**Figure 6.9:** Zakat on Income Calculator

#### 6.4.6 Fidiah Module

The main function of fidiah module is to calculate fidiah. Fidiah has two type of payment that is by rice or money in equivalent value. Only registered users can access this page. To calculate fidiah, fill in the required data and click 'calculate' button. Then system will calculate the fidiah value. Figure 6.10 shows the fidiah calculation page.

Figure 6.10: Fidiyah calculation page

### 6.4.7 Heritage Module

The main function of heritage module is to calculate heritage based on faraid. Only registered users can access this page. To calculate heritage, fill in the required data and click 'calculate' button. Then system will calculate the heritage value for each heir.

Figure 6.11 shows the heritage calculation page.

Figure 6.11: Heritage Calculation Page



## 6.4.8 Waqaf Module

The main function of waqaf module is to search the waqaf counter based on state. Only registered users can access this page. To search waqaf counter, select the state, then system will display the waqaf counter that is located in the state. Figure 6.12 shows the waqaf counter page.

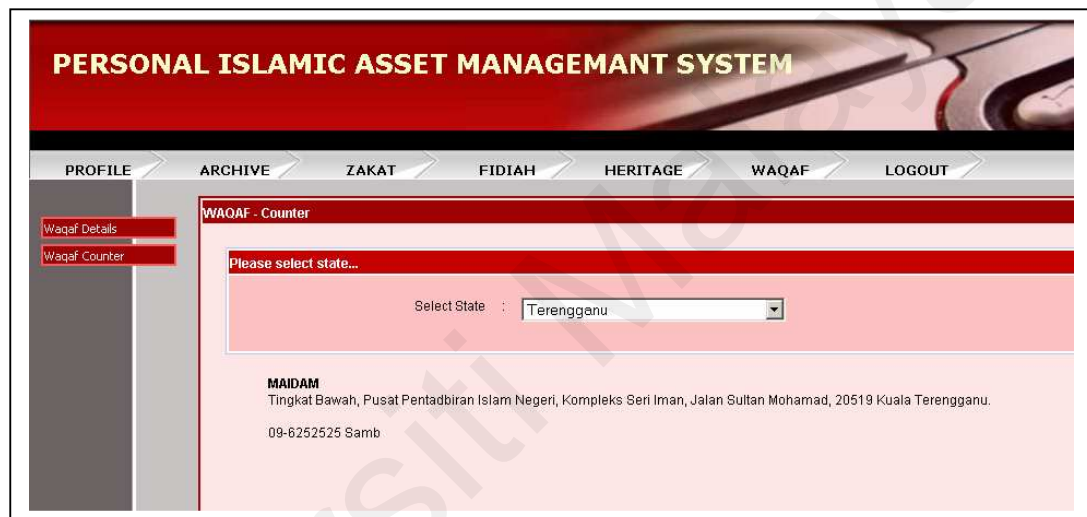


Figure 6.12: Waqaf Counter Page

## 6.5 Conclusion

This chapter discussed about system implementation. Implementation describes in detail the function of each class and operation done by each method. The attributes of each class have been listed. Besides the system functionality, this chapter also described the system environment and output sample. System environment described the system is compatible with various platform, while output sample described about the execution of the main function of each module from user point of view. Next chapter will discuss the system evaluation and system measurement.

## **Chapter 7**

### **Evaluation**

#### **7.1 Introduction**

Employing Rational Unified Process (RUP) model in developing the system, this chapter maps the transition phase. In transition phase the system has moved from software development organization to the end user. The activities in this phase include the system evaluation and system measurement. Evaluation chapter elaborates the usability test and system measurement of the Personal Islamic Asset Management System using Object-oriented Approach.. Usability test is a test to measure user's satisfaction of the system and analyze their comments in order to improve the system. It will cover the testing procedure such as evaluation survey and survey outcome analysis. The results of the survey were analyzed statistically on graphs and will be discussed. System measurement is the measurement of the system using object-oriented metric. There were six existing object-oriented metrics method which are Weighted Method per Class (WMC), Depth of Inheritance Tree (DIT), Number Of Children (NOC), Coupling Between Object classes (CBO), Response For a Class (RFC) and finally Lack of Cohesion in Method (LCOM).

## 7.2 Evaluation

System evaluation was used to ascertain whether the Personal Islamic Asset Management System using Object-oriented Approach met the essential user requirements. The aim of this section is to evaluate in term of:

- Ease of use of the Personal Islamic Asset Management System using Object-oriented Approach.
- Functionality of each module in Personal Islamic Asset Management System using Object-oriented Approach.
- Overall functionality of Personal Islamic Asset Management System using Object-oriented Approach.
- Potential effectiveness of the Personal Islamic Asset Management System using Object-oriented Approach.

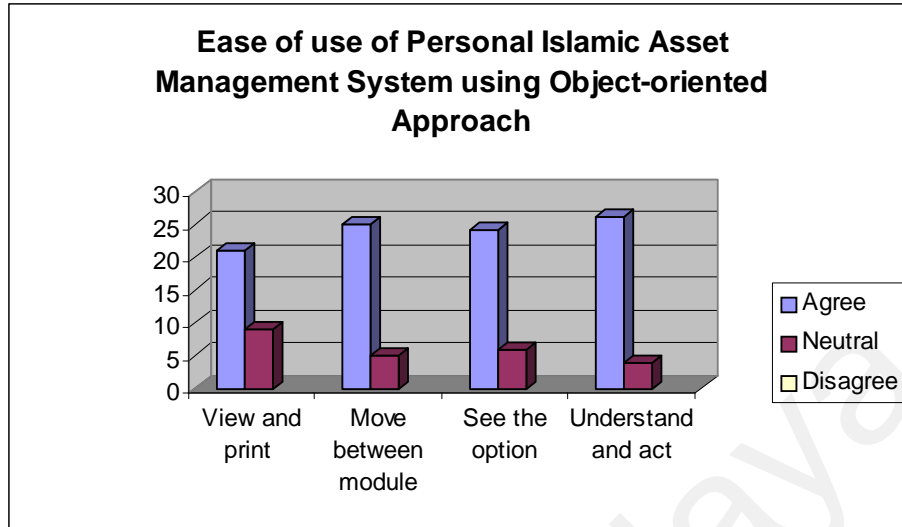
At this stage, the system evaluation verifies the whole system function properly and end users will be involved in the evaluation. System evaluation will be tested by end users to make sure the objectives and requirements of the proposed project will be fulfilled. In order to make the evaluation more credible and reliable, the program testers are randomly chosen and ranged from diploma to master degree holders. Each of the end users has tested the system individually. Evaluation questionnaires have been distributed to end-users during the testing process. End users have evaluated the system accordingly and their feedbacks and comment on the system have been filled up in the questionnaires forms (refer Appendix D).

The questionnaire was divided into four parts. Part A consists of questions about ease of use of Personal Islamic Asset Management System using Object-oriented Approach. Part B consists of questions regarding to functionality of each module in Personal Islamic Asset Management System using Object-oriented Approach. Part C consists of questions regarding overall functionality of Personal Islamic Asset Management System using Object-oriented Approach. Finally, parts D consists of questions about potential effectiveness of the Personal Islamic Asset Management System using Object-oriented Approach.

### **7.2.1 Evaluation Analysis**

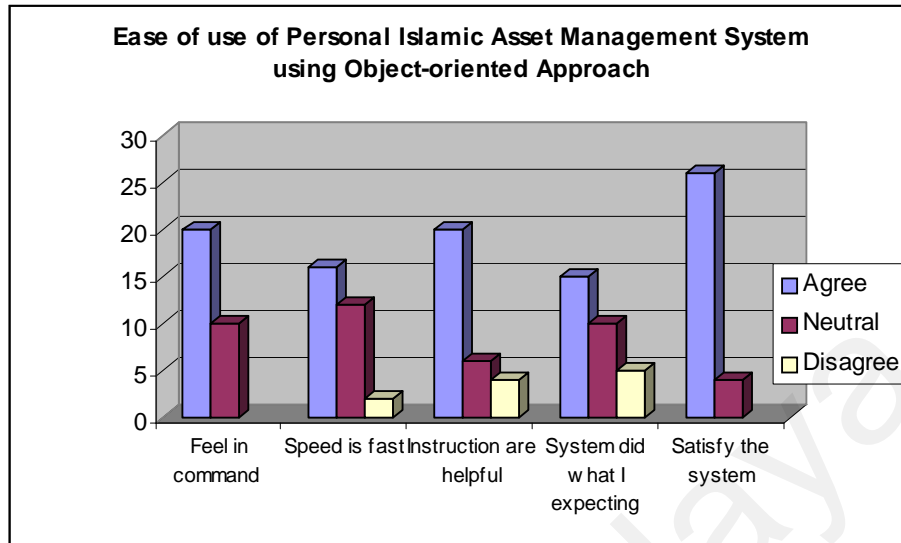
Part A consists of 9 questions regarding the ease of use of Personal Islamic Asset Management System using Object-oriented Approach. The graph for part A was divided into two parts, part 1 was for question 1 to question 4 and part 2 was for question 5 to question 9.

From 30 people, 21 of them agree that it is easy to print and view the information from the system and the remaining 9 are neutral. 25 of the respondents agree that it is easy to move from one module to another and the remaining 5 are neutral. 24 of the respondents agree that it is easy to see at a glance the options at each stage, whereas another 6 are neutral. 26 of them agree that they can understand and act on the information provided by this system and the other 4 are neutral. The analysis of above questions is illustrated in figure 7.1.



**Figure 7.1:** Ease of use of Personal Islamic Asset Management System using Object-oriented Approach (part 1)

20 respondents agree that they feel in command when using this system, but the rest are just neutral. 16 respondents agree that the system is fast enough, 12 respondents rates neutral and 2 respondents rates disagree. 20 respondents agree the instruction and prompts are helpful, 6 respondents' rates neutral and 4 respondents disagree. 15 respondents agree that the system did as what they were expecting, where 10 respondents rates neutral and 5 respondents rates disagree. 26 respondent rates agree that they satisfy working with this system and 4 respondents' rates neutral. The analysis of above information is shown in figure 7.2.

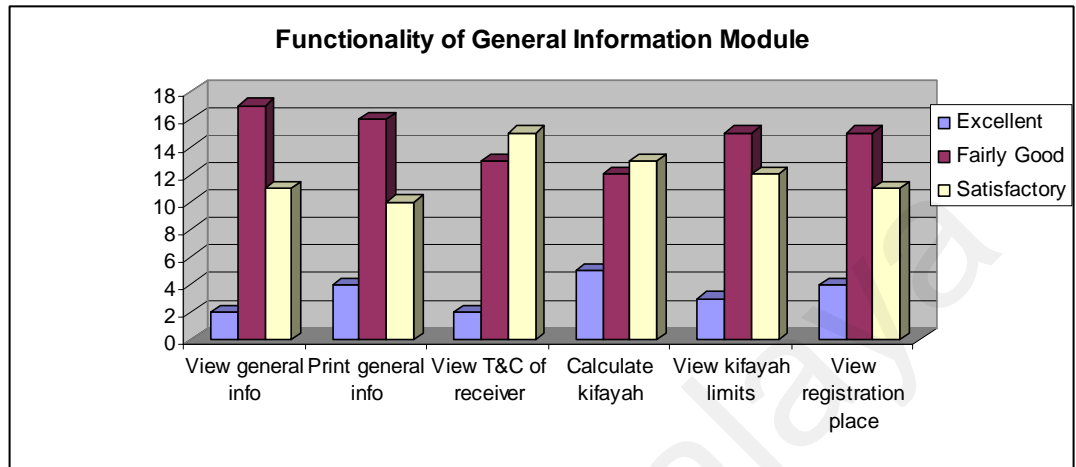


**Figure 7.2:** Ease of use of Personal Islamic Asset Management System using Object-oriented Approach (part 2)

Part B was the questionnaire about functionality of each module in Personal Islamic Asset Management System using Object-oriented Approach. For general information function, 2 respondents' rates excellent, 17 respondents' rates fairly good and 11 respondents' rates satisfactory. For print the general information functions, 4 respondents' rates excellent, 16 respondents' rates fairly good and 10 respondents' rates satisfactory. For view the term and condition of zakat and fidiah receiver function, 2 respondents' rates excellent, 13 respondents' rates fairly good and 15 respondents' rates satisfactory. The calculation of the kifayah to indicate *maskeen* or *fuqaraa'* category

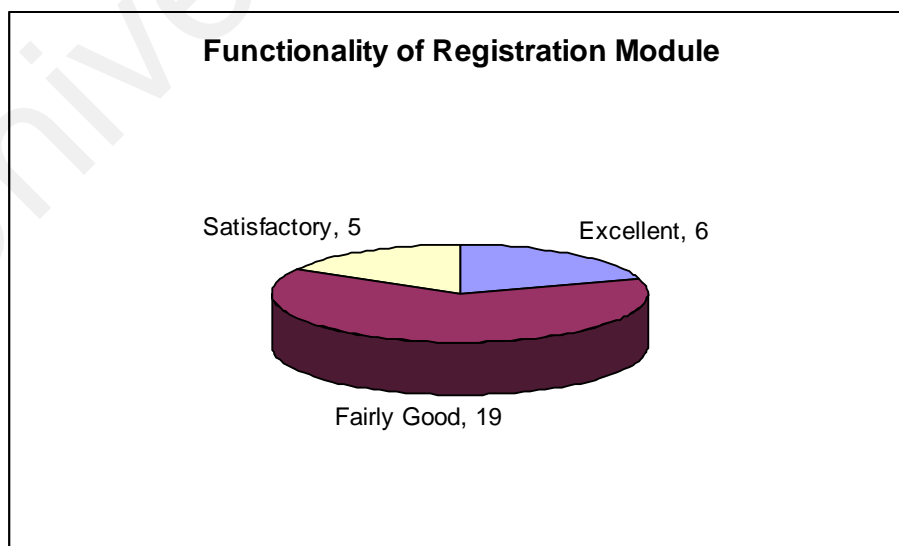
function, 5 respondents' rates excellent, 12 respondents' rates fairly good and 13 respondents' rates satisfactory. For view the type of help offers and kifayah limits function, 3 respondents' rates excellent, 15 respondents' rates fairly good and 12 respondents' rates satisfactory. For view the registration place for zakat and fidiah

receiver function, 4 respondents' rates excellent, 15 respondents' rates fairly good and 11 respondents' rates satisfactory. The above information is illustrated as in figure 7.3.



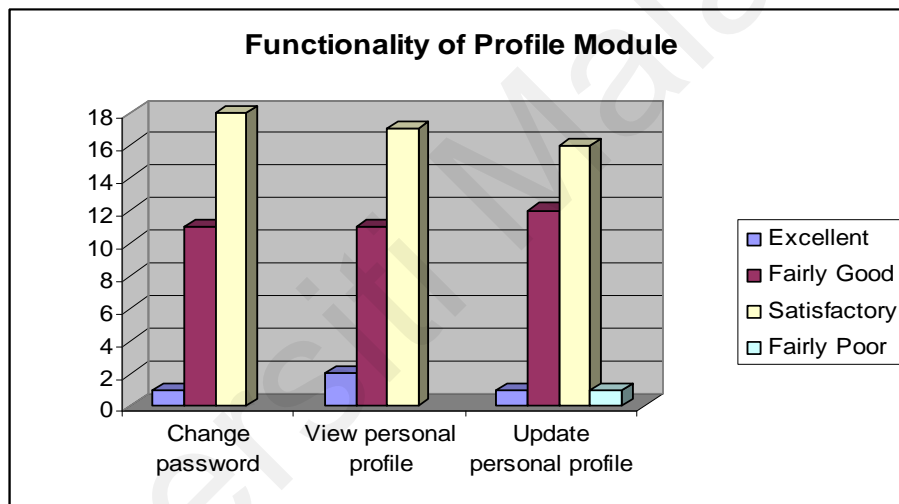
**Figure 7.3:** Functionality of General Information Module

As for the user registration module, 6 respondents' rates excellent, 19 respondents' rates fairly good and 5 respondents' rates satisfactory for register as user to the system function. Figure 6.4 shows a pie chart for the functionality of this module.



**Figure 7.4:** Functionality of Registration Module

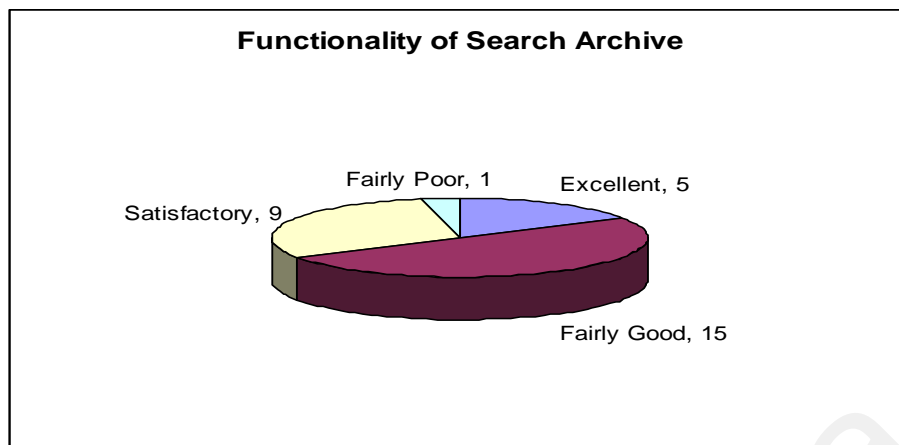
At profile module, 1 respondent rate excellent, 11 respondents' rates fairly good and 18 respondents' rates satisfactory for the change password function. 2 respondents' rates excellent, 11 respondents' rates fairly good and 17 respondents' rates satisfactory for the view personal profile function. 1 respondent rate excellent, 12 respondents' rates fairly good, 16 respondents' rates satisfactory and 1 respondent rate fairly poor for the update personal profile function. Figure 6.5 shows chart for the functionality of this module.



**Figure 7.5:** Functionality of Profile Module

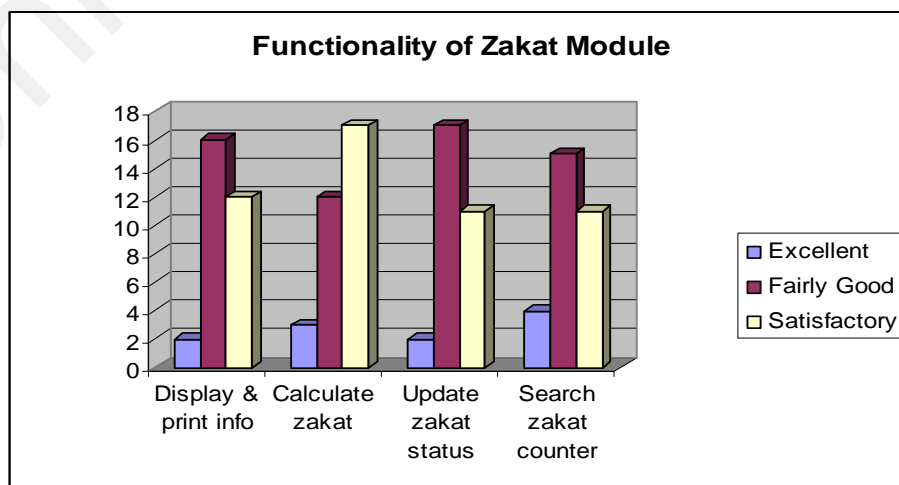
On the archive module, 5 respondents' rates excellent, 15 respondents' rates fairly good, 9 respondents' rates satisfactory and 1 respondent rate fairly poor search for the archive files function. Figure 7.6 shows pie chart for the functionality of archive module.





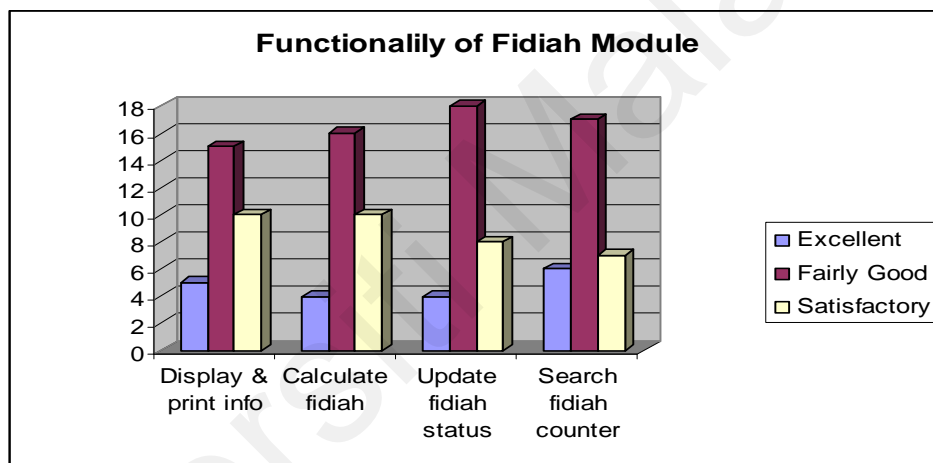
**Figure 7.6:** Functionality of Archive Module

On zakat module, 2 respondents' rates excellent, 16 respondents' rates fairly good and 12 respondents' rates satisfactory for the display and print detail information of zakat function. 3 respondents' rates excellent, 12 respondents' rates fairly good and 15 respondents' rates satisfactory for the calculate zakat for different categories function. 2 respondents' rates excellent, 17 respondents' rates fairly good and 11 respondents' rates satisfactory for the update zakat status function. 4 respondents' rates excellent, 15 respondents' rates fairly good and 11 respondents' rates satisfactory for search the zakat counter function. Figure 7.7 shows chart for the functionality of zakat module.



**Figure 7.7:** Functionality of Zakat Module

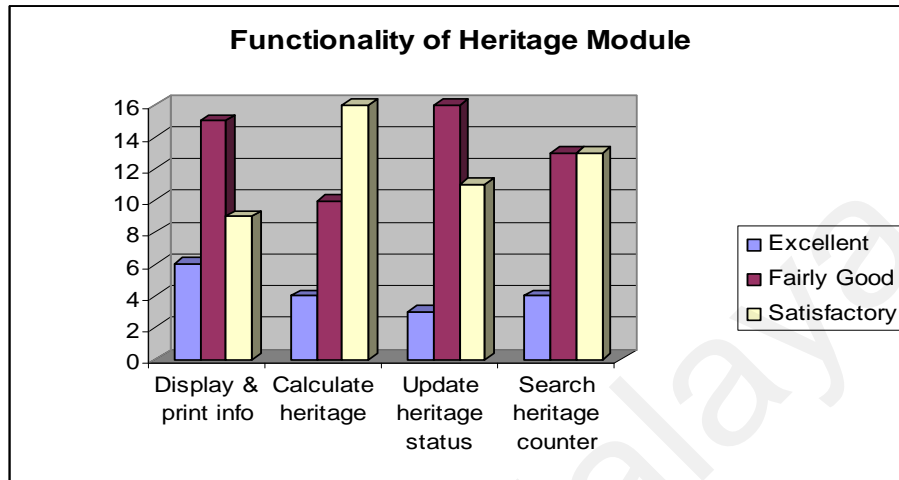
On fidiah module, 5 respondents' rates excellent, 15 respondents' rates fairly good and 10 respondents' rates satisfactory for the display and print detail information of fidiah function. 4 respondents' rates excellent, 16 respondents' rates fairly good and 10 respondents' rates satisfactory for the calculate fidiah for different categories function. 4 respondents' rates excellent, 18 respondents' rates fairly good and 8 respondents' rates satisfactory for the update fidiah status function. 6 respondents' rates excellent, 17 respondents' rates fairly good and 7 respondents' rates satisfactory for the search fidiah counter function. Figure 7.8 shows chart for the functionality of fidiah module.



**Figure 7.8:** Functionality of Fidiah Module

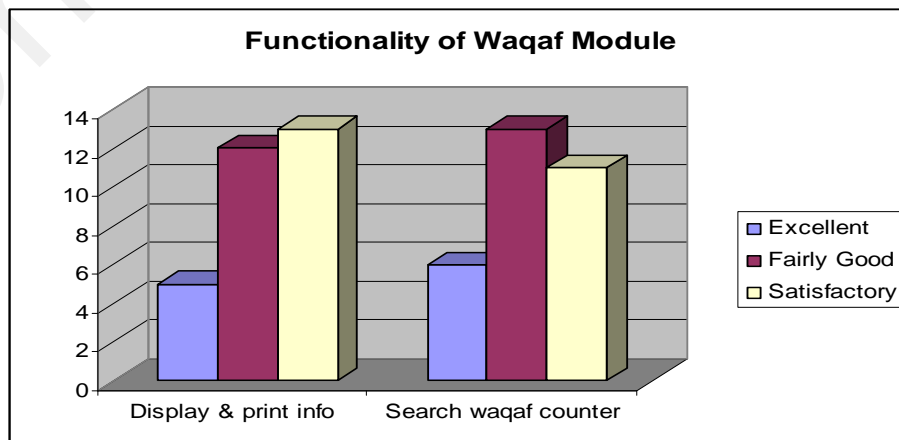
On heritage module, 6 respondents' rates excellent, 15 respondents' rates fairly good and 9 respondents' rates satisfactory for the display and print detail information of heritage function. 4 respondents' rates excellent, 10 respondents' rates fairly good and 16 respondents' rates satisfactory for the calculate heritage for different categories function. 3 respondents' rates excellent, 16 respondents' rates fairly good and 13 respondents' rates satisfactory for the update heritage status function. 4 respondents' rates excellent, 13 respondents' rates fairly good and 13 respondents' rates satisfactory

for the search heritage counter function. Figure 7.9 illustrated the functionality of heritage module.



**Figure 7.9:** Functionality of Heritage Module

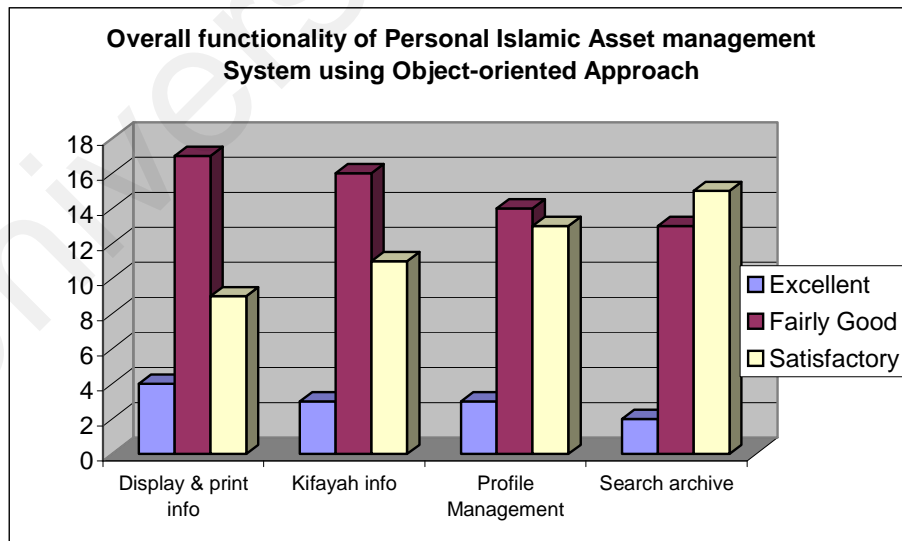
On waqaf module, 5 respondents' rates excellent, 12 respondents' rates fairly good and 13 respondents' rates satisfactory for the display and print detail information of waqaf function. 6 respondents' rates excellent, 13 respondents' rates fairly good and 11 respondents' rates satisfactory for the search waqaf counter function. Figure 7.10 illustrated the functionality of the waqaf module.



**Figure 7.10:** Functionality of Waqaf Module.

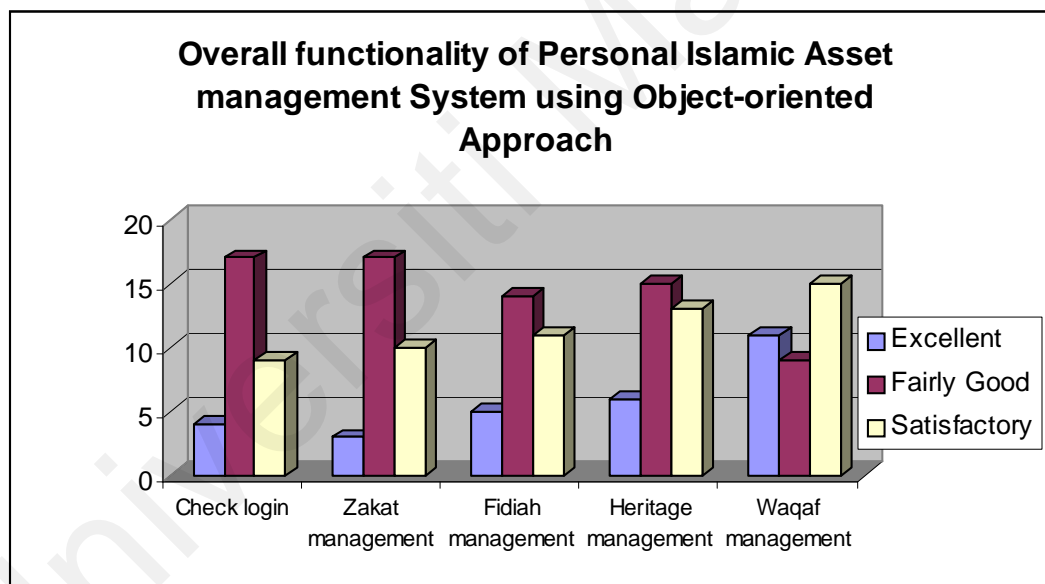
Part C consists of 9 questions regarding the overall functionality of Personal Islamic Asset Management System using Object-oriented Approach. The graph for part C was divided into two parts, part 1 was for question 1 to question 4 and part 2 was for question 5 to question 9.

4 respondents' rates excellent, 17 respondents' rates fairly good and 9 respondents' rates satisfactory for the display and print general information function. 3 respondents' rates excellent, 16 respondents' rates fairly good and 11 respondents' rates satisfactory for the display the information and calculate the eligibility of zakat and fidiah receiver function. 3 respondents' rates excellent, 14 respondents' rates fairly good and 13 respondents' rates satisfactory for the change password and update personal information function. 2 respondents' rates excellent, 13 respondents' rates fairly good and 15 respondents' rates satisfactory for the search related files in system archive function. The analysis of above questions is illustrated in figure 7.11.



**Figure 7.11:** Overall functionality of Personal Islamic Asset management System using Object-oriented Approach (part 1)

4 respondents' rates excellent, 17 respondents' rates fairly good and 9 respondents' rates satisfactory for the system login that allow users with correct username and password function. 3 respondents' rates excellent, 17 respondents' rates fairly good and 10 respondents' rates satisfactory for the personal zakat management function. 5 respondents' rates excellent, 14 respondents' rates fairly good and 11 respondents' rates satisfactory for the personal fidiah management function. 6 respondents' rates excellent, 15 respondents' rates fairly good and 9 respondents' rates satisfactory for the personal heritage management function. 2 respondents' rates excellent, 13 respondents' rates fairly good and 15 respondents' rates satisfactory for the personal waqaf management function. The analysis of above questions is illustrated in figure 7.12.

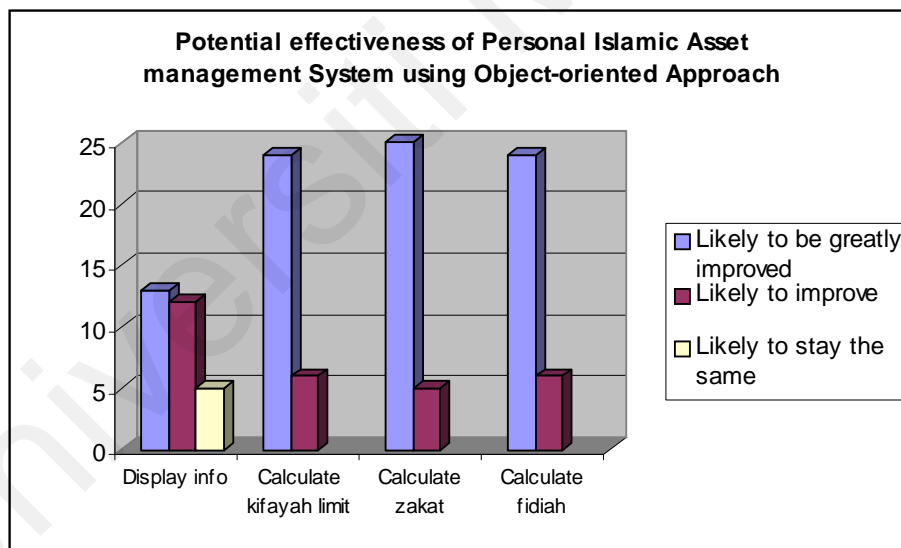


**Figure 7.12:** Overall functionality of Personal Islamic Asset management System using Object-oriented Approach (part 2)

Part D consists of 14 questions regarding the potential effectiveness of Personal Islamic Asset Management System using Object-oriented Approach. The graph for part D was divided into four parts, part 1 was for question 1 to question 4, part 2 was for question 5 to

question 8, part 3 was for question 9 to question 11 and part 4 for question 12 to question 14.

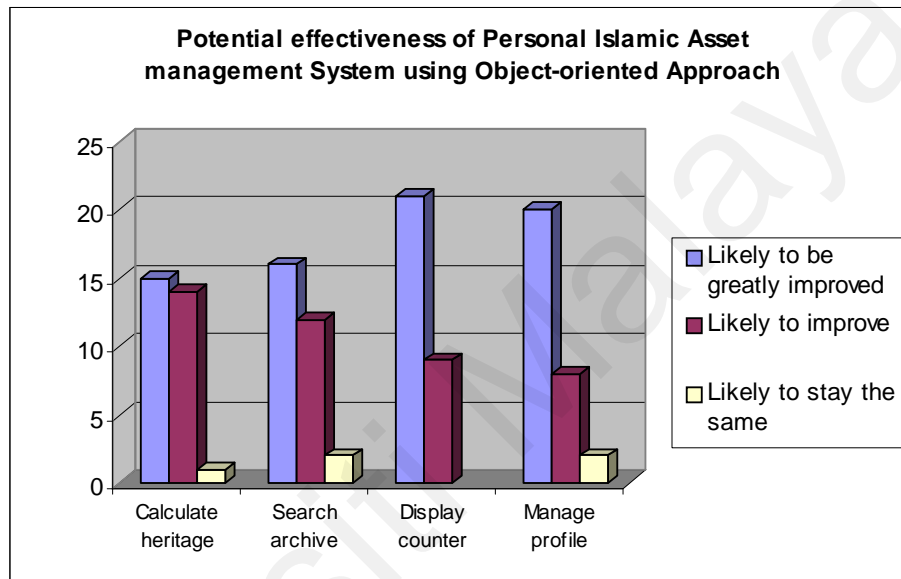
13 respondents' rates likely to be greatly improved, 12 respondents' rates likely to improve and 3 respondents' rates likely to stay the same for the display of information about Islamic asset management. 24 respondents' rates likely to improve and 6 respondents' rates likely to stay the same for the ability of calculating the kifayah limit. 25 respondents' rates likely to improve and 5 respondents' rates likely to stay the same for the ability of calculating the zakat. 24 respondents' rates likely to improve and 6 respondents' rates likely to stay the same for the ability of calculating the fidiah. The analysis of above questions is illustrated in figure 7.13.



**Figure 7.13:** Potential effectiveness of Personal Islamic Asset management System using Object-oriented Approach (part 1)

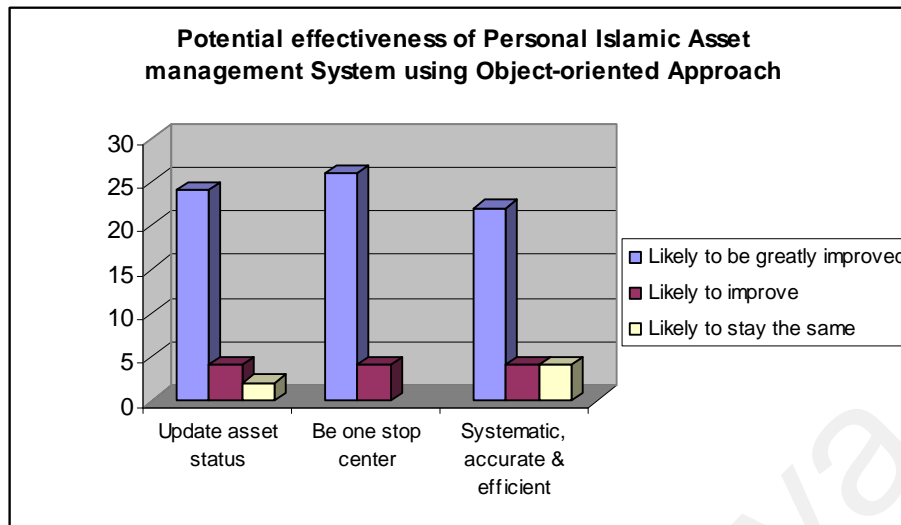
15 respondents' rate likely to be greatly improved, 14 respondents' rates likely to improve and 1 respondent rates likely to stay the same for ability of heritage calculation. 16 respondents' rates likely to be greatly improved, 12 respondents' rates

likely to improve and 2 respondents' rates likely to stay the same for searching of files in system archive. 21 respondents' rates likely to improve and 9 respondents' rates likely to stay the same for state based counter displaying. 20 respondents' rates likely to be greatly improved, 8 respondents' rates likely to improve and 2 respondents' rates likely to stay the same for managing user profile. The analysis of above questions is illustrated in figure 7.14.



**Figure 7.14:** Potential effectiveness of Personal Islamic Asset management System using Object-oriented Approach (part 2)

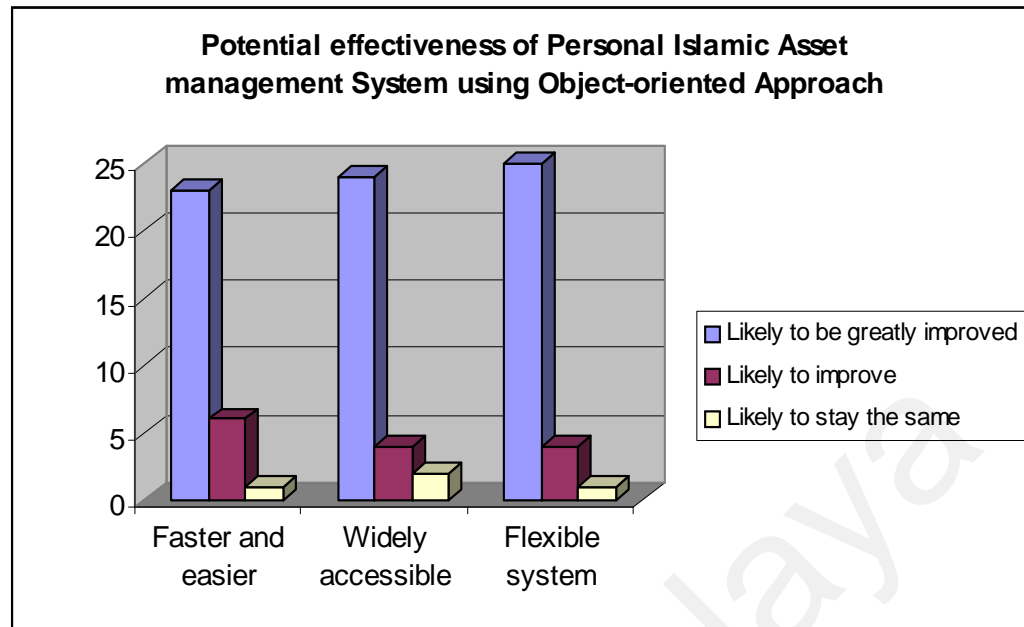
24 respondents' rates likely to be greatly improved, 4 respondents' rates likely to improve and 2 respondents' rates likely to stay the same for updating the personal status of asset management. 26 respondents' rates likely to be greatly improved and 4 respondents' rates likely to improve for being a one-stop center for Islamic Asset Management. 22 respondents' rates likely to be greatly improved, 4 respondents' rates likely to improve and 4 respondents' rates likely to stay the same for systematic, accurate and efficient system. Analysis of above questions is illustrated in figure 7.15.



**Figure 7.15:** Potential effectiveness of Personal Islamic Asset management System using Object-oriented Approach (part 3)

23 respondents' rates likely to be greatly improved, 6 respondents' rates likely to improve and 1 respondent rate likely to stay the same for the system which process the request faster and easy to understand its command. 24 respondents' rates likely to be greatly improved, 4 respondents' rates likely to improve and 2 respondent rates likely to stay the same for the system can be accessed anywhere and anytime via Internet.. 25 respondents' rates likely to be greatly improved, 4 respondents' rates likely to improve and 1 respondent rate likely to stay the same for the system is flexible for future enhancement. Analysis of above questions is illustrated in figure 7.16.





**Figure 7.16:** Potential effectiveness of Personal Islamic Asset management System using Object-oriented Approach (part 4)

### 7.2.2 Discussion on the Finding

Most of the respondents rates agree in part A; ease of use of the Personal Islamic Asset Management System using Object-oriented Approach. It shows that the system is user friendly and easy to use for various background of users.

Part B is the functionality of each module in Personal Islamic Asset Management System using Object-oriented Approach. Most of the respondent rates fairly good for the functionality of general information module, registration module, archive module, zakat module, fidiah module and heritage module. However, for profile module and waqaf module most of the respondents rates satisfactory. As a conclusion, it shows that each module of the system is well functioned as they rated fairly good for all modules in the system except profile module and waqaf module, which were rated satisfactory.

Most of the respondent rates satisfactory for profile module because the module only has the common functions like change password, view personal profile and update personal profile. Same goes to waqaf module that was also rated satisfactory because consist of basic functions like display waqaf information, print waqaf information and search waqaf counter. Waqaf module can be enhanced by adding function like online waqaf registration that is integrated with the waqaf system at Jabatan Agama Islam.

Part C is the overall functionality of the Personal Islamic Asset Management System using Object-oriented Approach. Most of the respondent rates fairly good in the overall functionality of the Personal Islamic Asset Management System using Object-oriented Approach. It shows that the system is well functioned and up to the expectation.

Part D is the potential effectiveness of Personal Islamic Asset Management System using Object-oriented Approach. Most of the respondent rates likely to be greatly improved in potential effectiveness of Personal Islamic Asset Management System using Object-oriented Approach. It shows that the Personal Islamic Asset Management System using Object-oriented Approach has a great potential to improve the personal Islamic asset management. It will simplify the way of managing those assets as well as save time and effort.

### **7.3 System Measurement**

Object-oriented system can be measured using software metrics. Software metrics can be used to find out the properties of the software that we are developing and predict the needed effort and development period. Many different kinds of metrics have been

developed during the past few decades matching with object-oriented programming. One of the most primitive and oldest metrics is Line Of Code (LOC).

In the beginning of 1990s, Chidamber and Kemerer, proposed six new object-oriented metrics to overcome the limitations of more traditional code-based metrics [40]. They are Weighted Method per Class (WMC), Depth of Inheritance Tree (DIT), Number Of Children (NOC), Coupling Between Object classes (CBO), Response For a Class (RFC) and finally Lack of Cohesion in Method (LCOM). The above metrics have certainly helped users analyse their code.

For this thesis, it will only be focused on Weighted Method per Class (WMC), Depth of Inheritance Tree (DIT) and Number Of Children (NOC) as its measurement metrics.

Weighted Method per Class (WMC) is defined as the sum of the complexities of all methods of a class [41]. The number of methods and the complexity of methods involved is a predictor of how much time and effort is required to develop and maintain the class. The larger the number of methods in a class the greater the potential impact on children, since children will inherit all the methods defined in the class. Classes with large numbers of methods are likely to be more application specific, limiting and possibility of reuse. The formula of Weighted Method per Class (WMC) is as below:

$$\text{Average number of method per object class} = \frac{\text{Total number of methods}}{\text{Total number of object classes}}$$

Hence, the Weighted Method per Class (WMC) for Personal Islamic Asset Management system using Object-oriented Approach is as follows:

Total number of method = 37

Total number object classes = 20

Average number of method per object class =  $37 / 20$

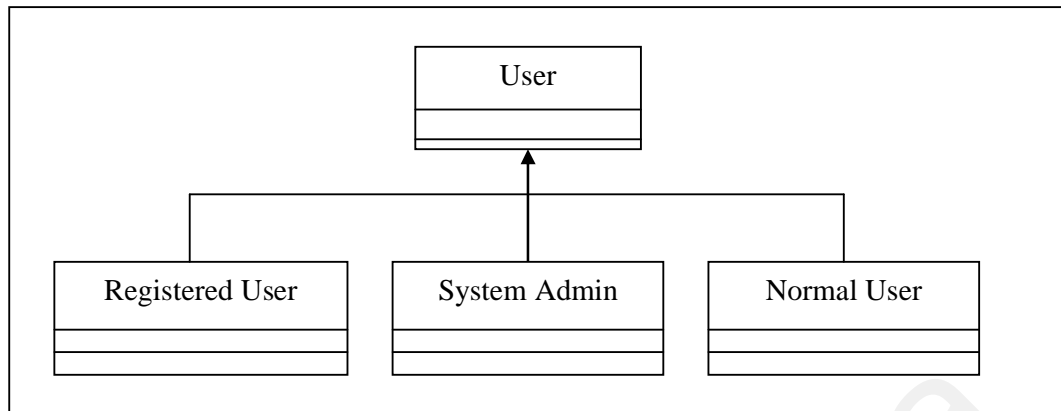
= 1.85.

Therefore, the Weighted Method per Class (WMC) for Personal Islamic Asset Management system using Object-oriented Approach is 1.85. The Weighted Method per Class (WMC) for the system is small, so it reduces the complexity and easy to be extended.

The next measurement metrics is Depth of Inheritance Tree (DIT) that defined as maximum length from the node to the root of the tree [41]. The deeper a class in hierarchy, the greater the number of method it is likely to inherit, making it more complex to predict its behavior. Deeper tree constitute greater design complexity, since more methods and classes are involved. The deeper a particular class is in the hierarchy, the greater the potential of reuse of inherited methods. The formula of Depth of Inheritance Tree (DIT) is as below:

$$\text{Inheritance tree depth} = \max (\text{inheritance tree path length})$$

In Personal Islamic Asset management System using Object-oriented Approach there is only one inheritance relationship as figure 7.17:



**Figure 7.17:** Inheritance Relationship

Thus, the Depth of Inheritance Tree (DIT) for Personal Islamic Asset management System using Object-oriented Approach is 2 because the maximum inheritance tree path length of the system is 2. The Depth of Inheritance Tree (DIT) for the system is small, so it does not have greater method sharing, easy to test and comprehensive.

The final measurement metric for the system is Number Of Children (NOC), which defined as a number of immediate subclasses [41]. The greater number of children, the greater the reuse, since inheritance is a form of reuse. The greater the number of children, the greater the likelihood of improper abstraction of the parent class. If a class has a large number of children, it may be a case of misuse of sub classing. The number of children gives an idea of potential influence a class on the design. If a class has large number of children, it may require more testing of the methods in that class.

Consequently, the Number Of Children (NOC) of Personal Islamic Asset Management System using Object-oriented Approach is 3 as reference to figure 7.17. The Number Of Children (NOC) of the system is considered small, so the reusability is also small, but it has the proper abstraction of the parent class.

## **7.4 Conclusion**

This chapter discussed about system evaluation. Evaluation describes about usability test of the system to make sure the system meet users' expectation. The results from usability test were analyzed statistically on graph and the findings from the test were discussed. This chapter also discussed about system measurement, which focused on Weighted Method per Class (WMC), Depth in Inheritance Tree (DIT) and Number Of Children (NOC). The next chapter is the final chapter of the thesis. It will discuss the conclusion and future works.

## **Chapter 8**

### **Conclusion and Future Work**

#### **8.1 Introduction**

This final chapter of the thesis discusses the conclusion and future works. Conclusion will be on the thesis' aim, method used and contribution made. Also, it explains the aim of the thesis and method used in order to achieve that aims. It also discusses the contributions made by this thesis. Future works section elaborates how to extend and enhance the thesis in the future.

#### **8.2 Aims and Method**

The aims of Personal Islamic Asset Management System using Object-oriented Approach are as follows.

- To identify sources of Islamic asset and procedure of managing them.
- To develop an object-oriented implementation model in managing the asset in Islamic way.
- To develop a system for managing personal Islamic asset and identify the proper channel of distribution.

- To evaluate the system usability and system metrics.

The research methods used were literature review and interview. The literature review was undertaken to have further understanding of the research problem in order to design the system using object-oriented software engineering approach. The interviews were undertaken to fulfill other requirements for Personal Islamic Asset Management System using Object-oriented Approach.

The first aim was to identify sources that will be considered as Islamic asset and procedure of managing them. Investigation on which asset is consider as Islamic assets and the procedure of managing those assets in Islamic way has been done. A detailed literature review in chapter 2 and analysis on data collected from interviews in chapter 3 provided an understanding for the system sources as well as the procedure of managing them.

The second aim was to develop an object oriented implementation model in managing the asset in Islamic way. The Personal Islamic Asset Management System using Object-oriented Approach was developed via object-oriented model. The study on how to model the system based on object-oriented model has been done. Requirement analysis and design that has been done in chapter 4 and chapter 5 provided understanding for the system model.

The third aim was to develop a system for managing personal Islamic asset and identify the proper channel of distribution. The proper channel to distribute the Islamic asset was found through the interview session. The analysis of collected data in chapter 3 has identified the proper channel in distributing and receiving the Islamic assets. The



requirement needed in developing the system was discussed in chapter 4 and the system model using UML has been detailed out in chapter 5.

The fourth aim was to evaluate the system using usability testing and software metrics. The result from the usability testing was summarized in chart format. The finding from the usability testing has been analyzed and discussed as in chapter 7. The system has been measured using object-oriented metric which was also explained in chapter 7.

### **8.3 Contributions Made by This Thesis**

This thesis is within the context of Personal Islamic Asset Management System using Object-oriented Approach in particular and object-oriented software engineering in general. Consequently, the thesis has contributed to two groups of research that is public and object-oriented software engineering.

The thesis has contributed to the public in the following ways:

- Provide one stop center for public users to manage their personal Islamic assets.
- Provide detail information about Islamic asset management especially for zakat, fidiah, waqaf and heritage.
- Provide calculator in helping user to calculate their zakat, fidiah and heritage.
- Provide the guidelines and calculator to determine the zakat and fidiah receiver.

The thesis contributed to the field of object-oriented software engineering in the following ways:

- Through the development of the system. The system can be used to provide the understanding of object-oriented software engineering approach.

- Through the analysis and design. The analysis and design of Personal Islamic Asset Management System using Object-oriented Approach can be used as a model in object-oriented software engineering system development.
- Through system measurement. The Personal Islamic Asset Management System using Object-oriented Approach can be used as a model in object-oriented metrics measurement.

## **8.4 Future Works**

This thesis has generated many ideas that can be further researched on or improved.

Some of these ideas are briefly presented below:

- Online payment.
- Enhancement of heritage calculator.
- Online registration for zakat and fidiah receiver.
- Online financial report.
- Online asset registration for waqaf.

### **8.4.1 Online payment**

Online payment means that user can make payment for their zakat and fidiah through the system. For this purpose, the system have to be integrated to the system at Pusat Zakat and Jabatan Agama Islam for each state as well as the bank. Before making the payment, user has to register with Pusat Zakat or Jabatan Agama Islam to get their zakat and fidiah ID.

#### **8.4.2 Enhancement of heritage calculator.**

Enhancement of heritage calculator means that instead of having the fraction as a portion for each heir, the calculator can produce the result in RM value. For this case, user need to enter the heritage asset value in RM and the calculator will calculate the portion for each heir both in RM and fraction. It will further enrich the system.

#### **8.4.3 Online registration for zakat and fidiah receiver.**

The public user can register as zakat and fidiah receiver from the system after calculation of their eligibility using the kifayah calculator has been done. The data will be sent to Pusat Zakat or Jabatan Agama Islam for each state depending on the residency of the registered users.

#### **8.4.4 Online financial report.**

Online financial report means that user can view the financial report for the particular year through the system. The financial report is for the zakat, fidiah and waqaf. The report should display the collection and distribution of zakat and fidiah for each particular year. For waqaf, the report may describe the asset, value, location and what have been done with the waqaf asset.

#### **8.4.5 Online asset registration for waqaf.**

Online asset registration for waqaf would enable user who wants to waqaf their asset, to simply register it via the system. The system will send the data to the Jabatan Agama Islam of the particular state.

## 8.5 Conclusion

The thesis has been developed using object-oriented software engineering approach. The system is capable of managing user's personal Islamic asset such as zakat, fidiah, heritage and waqaf. In addition, the system gives detailed information about these assets including calculator to calculate zakat, fidiah, heritage as well as kifayah. The features of the system can be extended to be integrated with online payment, online registration for zakat and fidiah receiver, online financial report, online asset registration for waqaf. Lastly, the further enhancement can be done on the heritage calculator.

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