PERSONAL FINANCIAL PLANNING USING RULE BASED EXPERT SYSTEM

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DEDICATION

Special dedication to my family members especially to my parent (Cheah Bin Tee and Yeap Cheok Keng) who always give me encouragement to finish this Undergraduate Final Year Project.

To my Supervisor
Mr. Wan Muhammad Syahrir Bun Wan Hussin

To all my course mate
Forth Year BCS 14/15

To all FSKKP's lecturers and staffs

To all UMP-ian friends and friend out there

Thank you for your support and wonderful teaching

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ABSTRACT

Personal Financial Planning Application is a web-based application that implemented by artificial intelligence technique. The idea behind this project development is the statistic shows that there is an amount of number of Malaysian young group people in declared as bankruptcy. Most of the problem is that people cannot manage their finances in a proper way. This application developed to help people manage and control their expenses by giving suggestions base on their monthly salary. By using Rule Based Expert Application technique, this application has generated a suggestion on personal financial by month regarding the expenses. Based on this application, the priority must be clear all the debt and having some saving. This application already scoped into a fresh graduate student that had been started work in real life. By key in monthly income status, this application will be produced and gave a suggestion for personal financial planning. This application completely developed by guideline for Rapid Application Development (RAD) software process that very effective to finish this development process.

ABSTRAK

Perancangan Kewangnan Peribadi adalah aplikasi berasaskan web yang dilaksanakan oleh teknik kecerdasan buatan. Idea di sebalik pembangunan projek ini adalah statistik yang menunjukkan bahawa terdapat sejumlah beberapa orang kumpulan muda Malaysia diisytiharkan sebagai muflis. Kebanyakan masalah ini adalah orang yang tidak boleh menguruskan kewangan mereka dengan cara yang betul. Aplikasi ini dibangunkan untuk membantu orang ramai menguruskan dan mengawal perbelanjaan mereka dengan memberikan cadangan berdasarkan gaji bulanan mereka. Dengan menggunakan teknik Pakar Berasaskan Peraturan Sistem, aplikasi ini telah menjana cadangan pada kewangan peribadi mengikut bulan mengenai perbelanjaan. Berdasarkan permohonan ini, keutamaan mesti jelas semua hutang dan mempunyai beberapa simpanan. Permohonan ini sudah skop kepada pelajar siswazah baru yang telah memulakan kerja-kerja dalam kehidupan sebenar. Dengan memasukkan status pendapatan bulanan, permohonan ini akan dihasilkan dan memberi cadangan bagi perancangan kewangan peribadi. Aplikasi ini dibangunkan sepenuhnya oleh garis panduan bagi proses perisian Pembangunan Aplikasi Pantas (RAD) yang sangat berkesan untuk menyelesaikan proses pembangunan ini.

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LIST OF ABBREVIATIONS

FSKKP: Fakulti Sistem Komputer Kejuruteraan Perisian

FPS: Financial Planning Application

AKPK: Agensi Kaunseling dan Pengurusan Kredit

BCS: Bachelor of Computer Software

SDLC: Software Development Life Cycles

RAD:RapidApplicationDevelopment

INTRODUCTION

1.1 RESEARCH BACKGROUND

Personal Financial Planning and Management is fundamental knowledge for all businessmen, accountancy or treasurer to control and manage their accounts and regular audits in their profit per month. Associated with this proposal is about the Personal Financial Planning Application that can help people manage their finances through this application. This application is very useful that immediate to our daily life and help all levels of people to guide them to manage their money. These applications can provide few step and requirement such as first, demand some information from user step by step guidance. Second, the application will generate some result based on the user's information. This result might be helping some of us to plan their financial planning for their life. The result will generate with the comfortable planning through with a suitable income per month. In fact, around 60 people under 44 declared bankruptcy each day. This report released by the Malaysia Department of Insolvency (MDI) director-general Rohana Abd Malek. According to statistics from MDI, amount of values shows that the number of bankruptcies in Malaysia continuously upraise from year 2007 to 2013. There are 13,238 people were categorized as bankruptcy in 2007, 13,855 in 2008, 16,228 in 2009, 18,119 in 2010, 19,167 in 2011 and 19,575 in 2012, with those in the private sector or doing business forming the highest percentage (The Star, 2013).

Each and every person can make money through different ways. But not everyone can use their money in a proper way, they spend their money on an unessential thing most of them are teenagers. This is why this application is develop to the world, is useful for person how really needed. This application is an online application that can use anytime. This is re-new application that more completes result to generate the best financial planning. From the past application or the application that already done, example Counselling and Debt Management Agency (AKPK), they only give us the total amount and balancing money currently and real.

This is not enough reference for some people that want to know detail for every each item that they using daily. Besides that, to make this application work nicely, the best method is using ruled based expert application to implement in this project.

In this re-new application scope to fresh graduate that new involvement in the industry and almost using money from their pocket. For example, meal, dress, rent house, car, internet, bill phone and etc. all of this they need to use their own money within 1 year work and another year. In this issue, President of Congress of Union on Employees in the Public and Civil Services (CUEPACS)' Datuk Omar Osman said, only in 2009. Around 542 people and almost 50% from 1,086 young people declared as bankruptcy (kosmo, 2012). This application also scoped into the Kuala Lumpur area. This application scope to Kuala Lumpur because Kuala Lumpur is one of place that high living standards and really need the best financial planning to survive until the end.

1.2 PROBLEM STATEMENT

Nowadays, the average starting salary for Malaysia workers with Bachelor Degree is around RM2000++. Malaysians need to face the rising prices of goods and services with the small amount of salary. In general, prices of goods and services in Kuala Lumpur are very expensive compared to other state. Some of them not even can own a house in Kuala Lumpur just lend from other people. Furthermore, most of the people having problems with the financial planning on how to save money for overall expenses for a month and in the future. In fact, on 18th October 2012 in Berita Harian proposed the news about 50000 young bankruptcies in Malaysia in the 5 year range (Berita Harian, 18 october 2012). Most of this problem carried from fresh graduated that started work in industry. First, they didn't have any financial education and first time involve in the industry with a small amount of salary. Second, this is because they didn't have financial planning where they keep going to enjoy and use "future money" (credit card/loan from bank). Certain people, their salary is not too enough comparing with their expenses to buy anything. Moreover, this problem came out because most of us did not expose with financial planning and financial education. All of these are some of the reasons why fresh graduated workers having problem regarding their finances. In Malaysia, current practice mostly not careful or check the financial planning before having bankrupt. In education also, do not have any subject that teaches student how to

manage their money. This is needed to reduce the number of bankruptcies and especially for the young bankruptcies in Malaysia. In fact, from Counselling and Debt Management Agency (AKPK) state that 244,517 needed AKPK service to handle financial problems. (New Straits Times, 06 January 2014)

1.3 OBJECTIVE

1. To develop a Financial Planning prototype application
2. To apply and implement rule based expert system in application
3. To generate a suggestion solution for financial planning

1.4 PROJECT SCOPE

1. The user is a fresh graduate student that already started working.
2. The user status person is for single only. Not married and does not have any dependent person.
3. This application uses forward chaining technique rule based expert system.
4. This application is a Web application development using PHP and MySQL.

1.5 THESIS ORGANIZATION

This thesis consists of five (5) chapters. Chapter 1 will discuss on introduction to an application that conclude all elements of this project. Such as how this project automatically run on the web site, only the person that have all the criteria that already stated in the scope only can do this test. The result will come out with the reasonable result based on the data from the user. Besides that, in chapter 1 discuss about the problem statement that the main reason of this project. In the problem statement stated that to give the best solution to user to save their money using financial planning. Moreover, the importance is the objective of the application. That desired or needed result to be achieved by a specific time.

Chapter 2 will discuss about literature review of the older application that have before this. This chapter will elaborate and discuss about pass application form other developer. Such as find about their project, problem statement of their project, as usual the objective to build the application, methodology, and who they're responding. Besides that, type of software, hardware of technique they're using for their application, the testing and lastly how the final result came out after the application run.

Furthermore, for chapter 3 is a methodology that describes overall approach and framework of research. These parts more specific to the project, first is introduction that describes how the project done. That's mean to first step the application progress and activities. Seconds is methodology. Explain any method or technique that using in the application. Third is needed to describe the hardware and software in this application. For example, this application will use laptop, printer, MYSQL for database, PHP for the language and rule based for the method or technique. Lastly, Gantt chart also needed in this chapter. This importance for a researcher to have guidelines and due date to complete the project.

Next, chapter 4 is design and implementation. This part needs to give an early prototype of the application. That's mean need to print screen the application that already done. Also have to draw the process and guidelines to use this application. Such as, registration, budget calculator form and etc. In addition to complete chapter 4, need to have the implementation in data mining such as statistical data, percentage, graph, and etc.

Lastly, chapter 5 consists of result and discussion. For the result is the application that successfully created are needed to same as the objective that start early in the proposal. However, the conclusions are concluded all the results, testing, data, analyst, any fact element and lastly future suggestion and enhancement to the project. For example, if this project doesn't run successfully, give the suggestion how to improve the application and give and possible reason.

LITERATURE REVIEW

2.1 INTRODUCTION

The literature review is an evaluative report of information found that related to the selected case study. It is about explanation of the complete and current state of knowledge on a limited topic as found in academic books and journal articles. In this chapter will elaborate about financial planning, financial education problem in Malaysia, current practice on financial planning and management, introduction of expert application, existing application, intelligence application such as ruled based using forward chaining, purpose rule based in financial planning, example existing application using forward chaining.

2.2 INTRODUCTION OF FINANCIAL PLANNING

Financial planning is the process of estimating the capital of an investor's current and future financial state presently known variable to predict future cash flow, withdrawal plans and asset values. In other word, is an applied approach whereby with the financial planner can maximize the existing financial resources. The importance of financial planning is it will help you reach your goals to ensure you have adequate funds to enjoy your lifetime when your retirement, besides that, to ensuring a reasonable between outflow and inflow of the financial stability is maintained. Figure 2.1 is an Example of financial planning and management equation that a formula of financing, that need to combine in term of financial resources and financial techniques.

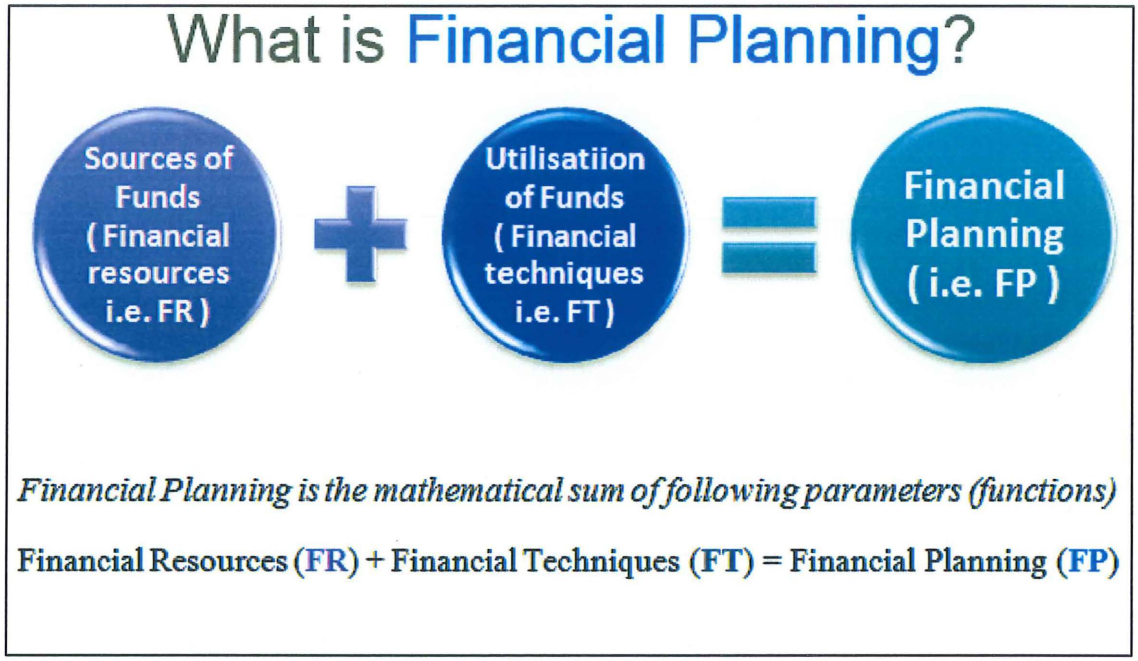


Figure 2.1: Financial Planning Example Equation

2.3 CURRENT NEWS OF FINANCIAL MANAGEMENT

This section is the fact that young Malaysia has a problem with the financial and going to become bankrupt. The news as below:

a) Around 200,000 Malaysians received AKPK services

From New Straits Times posted on January 06, 2014 stated that 244,517 Malaysian have received counselling from the Credit Counselling and Debt Management Agency (AKPK) and of the figure, 40.7 per cent or 99,347 people had to enlist in debt management programs. Among the main factors causing their financial problems were poor financial planning (22.9 per cent), high cost of medication (18.3 per cent), business failure (15.2 percent) and uncontrolled credit card usage (11.1 percent). (BERNAMA, 2014)

b) Bankruptcy on the rise

From The Star posted on February 18, 2014, stated that bankruptcy cases are on the rise with 16,306 people declared bankrupt from January to September last year, said PKR leader Datuk Seri Anwar Ibrahim. During the same period, he said over 27,432 bankruptcy petitions were fielded in the Malaysian courts. Anwar pinned this down to rising costs of living which forced Malaysians to take personal loans or credit cards as their disposable incomes diminished. This then exposes them to the risk of bankruptcy due to the higher rates of interests offered by these loans. (LAI, 2014)

c) Out of 90,807 borrowers helped by AKPK

From BERNAMA Online posted on August 02, 2013, stated that poor financial planning and living beyond one's means are among the main factors for debt and inability to repay loans, said Credit Counselling and Debt Management Agency (CCDMA) chief executive officer, Koid Swee Lian. Out of 90,807 borrowers helped by the agency under the Debt Management Program (DMP) from 2007 to May 31 last year, she said 20,886 or 23 per cent had poor financial planning. According to her, 18,161 or 20 per cent were in debt due to high medical expenses, others (17,253/19 per cent), business problems or failure (13,621/15 percent), failure to control credit card usage (9,989/11 percent), loss of employment (9,081/10 per cent), and death or loss of a source of income or failure in investment (908/one per cent each). During the same period, a total of 222,942 borrowers sought counselling from CCDMA but only 90,807 joined our program. (BERNAMA, 2013)

2.4 CURRENT PRACTICE ON FINANCIAL PLANNING AND MANAGEMENT

On April 25, 2014 an appointment with En. Musaha; the counsellor of Credit Counselling and Debt Agency (AKPK). Based on En. Musaha said that, the process of AKPK to manage people debt and planning the financial is based on a form (Appendix C) to give solutions or advices based on previous cases and expert opinion to the client. In the form, the client needs to fill in personal information (name, gender, race, income, number of family dependants and etc.) and details of financial and expenses for a month. Normally AKPK will advise the client to clear the entire credit card loan prior this is because it had two per cent of interest rate in a month. A good financial planning graph is that fifteen percent of saving (normal saving and emergency saving), thirty five per cent of debt (car loan, house loan, credit card loan and ptptn) and fifty percent of expenses (house rent, toll, petrol, maintenance, bill electric, bill water, bill Astro, shopping, food and etc.). AKPK will help client to reduce their loan interest rate to the minimum for example; reduced the house loan from eighteen per cent to ten per cent. AKPK will deliberate with all bank providers so that it can make client to settle all their debt based on terms and conditions. AKPK will identified client background based on information of (CTOS, 2012), CCRIS and (R. C. I. S. Bhd, 2013) from Bank Negara which can check client summons, previous credit card loan(settled) and etc.

2.5 INTRODUCTION OF EXPERT APPLICATION

According to (Robin, 2010) state that, expert application is a computer system that converts the decision-making ability of human expert which is known as artificial intelligence. Expert application is designed to provide expert quality performance on domain specific problem by reasoning about knowledge. An expert application is divided into two sub-systems which is inference engine and knowledge base. The knowledge base represents facts and rules and for the inference engine applies the rules to the known facts to deduce new facts. Inference engines can also include argument and analysis capabilities. For example, it can check lung disease, X-ray diagnosis, cancel detection, and diagnose pests and diseases for rice crop and suggest preventive measures. There have some advantages of using expert application. First, provides consistent answers for repetitive decisions, processes and tasks. Hold and maintain significant levels of information. Besides that, can work round the clock and can be used by the user more frequently and multi-user expert application can serve more uses at a time. The most disadvantages of expert application are lacking common sense needed in some decision making. In figure 2.2 describe in expert application Practice that user will give the facts to expert application, and then expert application will process and give the result to the user.

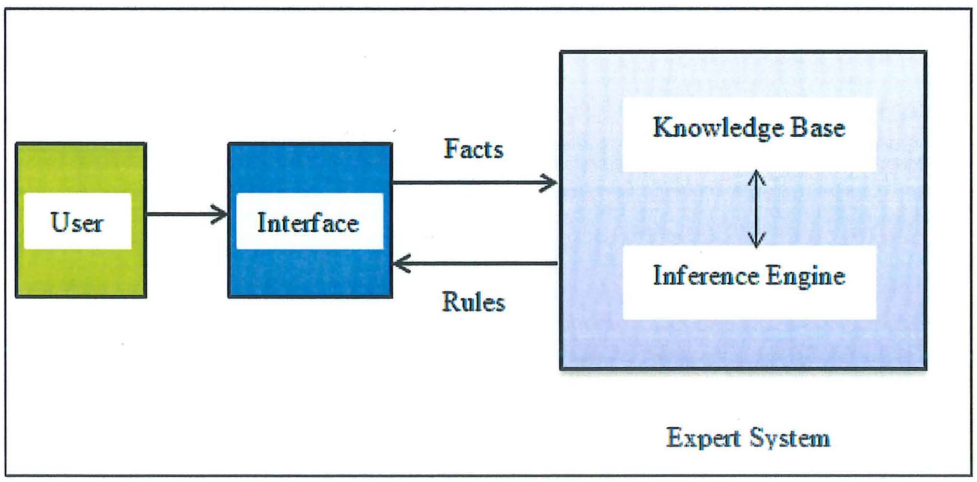


Figure 2.2: Expert System Practice

2.6 EXISTING APPLICATION FEATURE

a) Financial Planning In AKPK

From AKPK website, show that there are around 8 applications for financial planning and management to help public. Such as Financial Fitness Test, DMP Eligibility Test, Know Your Debts, Financial Checklists, Credit Card, House Loan, Hire Purchase and Net Worth. For this website, all application divided into those categories. The advantage of this application can more specifically into categories that user needed. But the disadvantage is user cannot find their overall budget and good advice about their expenses and also saving. (Kredit, 2012) In the figure 2.3 show the example of application in AKPK of financial planning and management.

Figure 2.3: Example of AKPK Website

b) Using MoneySmart Online Application

This is a web based application that developed by the Australian Securities and Investments Commission (ASIC). This website is secure to use and it can access by everyone who are needed. From this website, there is a lot of applications for financial planning and management that has been categories based on the particular problems and also specific to particular levels of people. For example, it can be specific to a person who is under 25 year old, families, women, educators, life events and self-employed people. Besides, MoneySmart application provides much tipping point to the problems face now. There is a smart tip said that "If you have borrowed money at a high interest rate, make paying off that debt your priority before saving for other goals." for the user who want to make a saving. (Smart, 2014) In the figure 2.4 show one of the example of Money Smart application for financial planning and management.

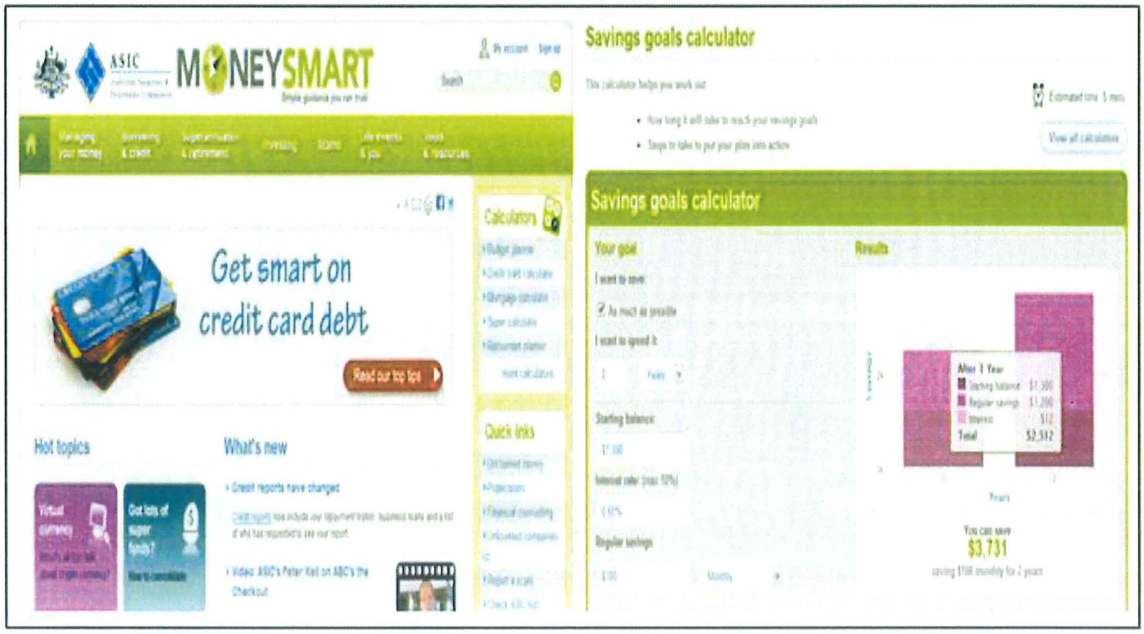


Figure 2.4: Example of MoneySmart Website

c) Using MoneyHelp Online Application

MoneyHelp is a not-for-profit service supported by the Victorian and Australian Governments. This is a web based application can be accessed by everyone who needed. From this web site, it provided a lot of feature and services about the financial management and also provided advice to help user manage their money and debt based on general knowledge. For example, Losing Your Job, Managing Bill and Debt, Your Debt Option and Housing Loan. Furthermore, it is categories the application to specific problem and giving a general solution to user for their problems face.(Help, 2014) In figure 2.5 shows the example of the Money Help system for the housing cost application.

Figure 2.5: Example of MoneyHelp Website

2.7 INTELLIGENCE TECHNOLOGY

2.7.1 Rule Based Expert Application

(Goddard, 2006) state that, rule based application is a relatively simple model that can be adapted to any kind of problems. A very general inference engine is based on representing knowledge in a rule base and each rule is of the form of "***If*** G ***Then*** K". The set G is called the conditions and the set K is the consequents. A rule is triggered if all the conditions are satisfied and then the consequents are fired. Moreover, in software development rule-based applications can be used to create software to solve the particular problem by providing a solution in place of a human expert. One of the concept of rule based is has provided one of the most enduring and compelling windows in the structure of the human mind. Besides that, the concepts are mental representations that are used to discriminate between relations, recommendations, directives, strategies or other states of affairs. Example of rules:

This example might be the rule base of a simple vehicle recognizer.

Rule 1

If x wears T-Shirt

Then x is a human

Rule 2

If x using computer

Then x is a human

Rule 3

If x have a car number plate CDA 1201

Then x is En. Syahrir

Rule 4

If x wear T-Shirt

And x using computer

And x study at UMP

Then x is FSKKP student

Rule 5

If x have a car number plate CDA 1201

And x work at UMP

Then x is a UMP Lecturer

Rule 6

If x is FSKKP student

Then x is a computer science student

2.7.2 Forward Chaining

According to (Holland, 2010) state that, forward chaining is also known as data driven search, is that provide of facts and repeatedly continue to the next rules to generate new facts to get to the goal. Furthermore, the systems begin with the first set of elements in the operating place and keeps on firing rules until there are no rules which can be applied or goal has been stated. In other word, forward chaining called as a production application. Each of the rules has miniature procedure called a production. Production application is composed of three components. These are the rule set, a working area which contains the current state of the application and an inference engine which knows how to apply the rules. The rules are from Left hand side (LHS) (right hand side (RHS). Figure 2.6 describe about example of the forward chaining process. This is a basic process of forward chaining.

RULE 1:

IF E is true **AND** F is true

THEN G is true (E&F → G)

RULE 2:

IF D is true **AND** B is true **AND** C is true

THEN E is true (D&B&C → E)

RULE 3:

IF A is true

THEN D is true (A → D)

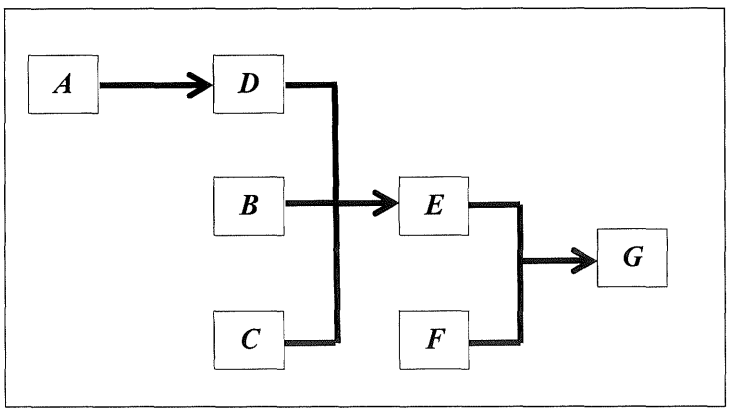


Figure 2.6: Example of Forward Chaining Process

2.8 PURPOSE RULE BASED IN PERSONAL FINANCIAL PLANNING

From this case study, I prefer to use rule based to implement the financial planning because the rule based technique more relevant to do this project. Based on this project, should come out with the best suggestion for the user to have a saving in their account. Besides, to get their current financial statement, to produce excellence suggestion to the user to manage and plan their finances in the future. This application uses a rule "if-else" statement to make a human expert system. Compare to fuzzy logic, artificial neural network, and frame-based not really suitable for this application.

2.9 COMPARISON BETWEEN ANOTHER EXPERT APPLICATION

	RULE BASED	**FUZZY LOGIC**	**ARTIFICIAL NEURAL NETWORK (ANN)**	**GENATIC ALGORITHM (GA)**
Definition	A set of rules that a human expert follows in diagnosing a problem.	The theory of fuzzy logic is a modeling of imprecise concepts and dependencies.	A model of reasoning based on the human brain.	A class of natural evaluation work based on biological evolution
Concept	Every rule have their own solution	Fuzzy Set function. (Fuzzification and Defuzzification)	Pattern recognition - E.g. pattern whether (what-if)	Optimization. - E.g. scheduling
Advantages	- The application can represent quite	- Related input to output in linguistic terms, not	- Suitable for large dataset - Eager to learn	- It can solve problems with multiple solution

	naturally (IF-THEN) production rules to solve problem - The syntax of production rules is an independent piece of knowledge.	numerical, easily human to understand. - The simplicity allows the solution of pass unsolved problems. - More observed variable can be evaluated.	- The ability to generalize patterns or learn from a large set of data.	- Easily transferred to existing simulations and models. - Every optimization problem can be solved by described with the chromosome encoding.
Disadvantages	- Need to declare all thousands of rules and solution in the database.	- Hard to develop a model from a fuzzy application.	- To run a program, neural network need for training before can operate. - For large neural network application needs a high processing time.	- The certain variant problem cannot be solved because they're poorly fitness functions - GA properly limits the genetic algorithms use in real time applications.
Suitable for FPS	Yes because every case is unique. Every rule have their own solution	No, because if change the variable the formula not change.	No, because more on pattern recognition.	No, because GA more on generating optimization.

Table 2.1: Comparison of Expert Application

2.10 EXAMPLE OF EXISTING APPLICATION USING FORWARD CHAINING

2.10.1 Malaysian Meteorological Department (MMD) Official Portal Using Rule-Based Forward Chaining

The official portal of the Malaysian Meteorological Department (MMD) which is developed by the Ministry of Science, Technology and Innovation (MOSTI) used forward chaining statement to propose a rule to predict the Malaysian weather. The concept of meteorological prediction systems is to get information based on previous data and make a conclusion. This website has a user friendly and ease to use where the user can point to the specific area such as state, district, major town or tourist area in Malaysian. This system has provided a column by area for the user to choose and will generate results based on the selection of the user. (Department, 2013) In figure 2.7 show the Malaysia Meteorological Department official portal that using forward chaining method.

Figure 2.7: Malaysian Meteorological Department

2.10.2 *IQ Test for Kids Using Rule-Based Forward Chaining*

IQ test for kids is a very simple and interesting system that provides a set of question for the IQ test. This system can test the intelligence or IQ for the kids by doing the test. There has categories into two groups where are aged from 4 to 8 years 11 months and age from 9 to 16. There are two sets of IQ test includes 36 and 60 questions and the scored will automatically generate when it finished. This system is using the rule-based forward chaining to set up the rules or questions based on human expert. The application gets the information from answering the question provided and the questionnaire using forward chaining technique. (kids, 2012) In the figure 2.8 show IQ test for kids' website that is using forward chaining method.

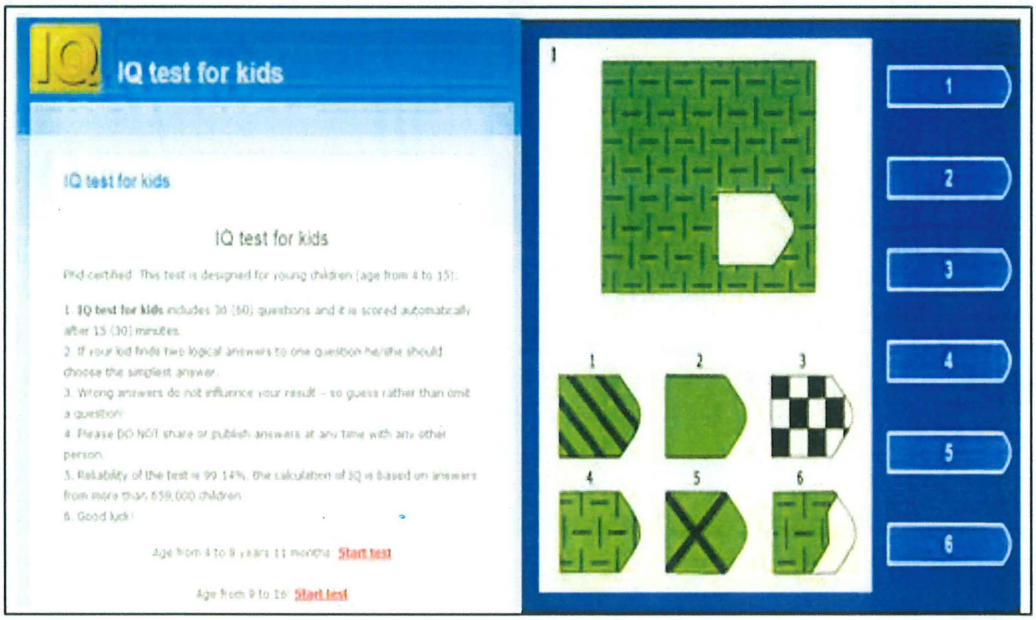


Figure 2.8: IQ Test for Kids

2.10.3 *Automated Teller Machine (ATM) Using Rule-Based Forward Chaining*

Automated Teller Machine is a machine that permits bank customers to gain access to their accounts with a magnetically encored plastic card and password. This system is using the rule based forward chaining technique where it sets up a rule and enable the customers to perform several banking operations without the help of a teller, such as to make deposits, withdraw money and transfer money. The rules that are set up to make sure this system can be run in secure and smooth. For example, if the bank balance is greater than the requested amount then the action is processed transaction. In the figure 2.9 shows the Automated Teller Machine (ATM) which is using a forward chaining method.

Figure 2.9: Automated Teller Machine

2.11 COMPARISON BETWEEN COMPUTER LANGUAGE

Table 2.2: Comparison of Computer Language

	PHP (Hypertext Preprocessor)	**JAVA**	**ASPX.NET**	**C++**
Concept	PHP code can be inserted into the HTML of the web and in conjunction with MYSQL database	Java is a general purpose object-oriented programming language. Java Program contains classes (define object and method).	A web site builder to dynamically build web page by inserting queries to the related database.	C++ is programming language and has object oriented features which can make the programmer create an object within the code.
Advantages	- It is an open source code can be developed and maintained by a PHP developer. - It's also fast since it uses much application	- Automatic memory allocation and junk collection - It is able to move easily from one computer to another. - Strong multithreadi	- It's easier to create a page by dividing the application into model, view and controller. - It's better for web application that can supported by a large team of developer	- C++ standard is the same on any platform or compiler. - A large amount of logic can be

	resource - Also can be run on many platforms including windows, Linux and Mac.	ng		proved and performed - Has memory management
Disadvantages	- All people can see the source code since it is an open sourced web. - Not suitable for large application because hard to maintain since it is not very modular.	- Java source code more easily to detect error compare with other languages. - It considerably slower and can take up more memory space compared to other compiled languages. - Not suitable for design scripting	- Does not allow for easy unit test. Need to code manually if want a Java script in an application - The view state can get really large and have a negative effect on performance	- Lacks of graphics, concurrency and expected of modern language. - It is very difficult to learn.

METHODOLOGY

3.1 INTRODUCTION

This chapter is discussing about method or approach and the framework of the project. This method is applied in financial planning and management project by conducted based on Rapid Application Development (RAD) methodology. Before developing this project, a research had been made to the existing application, any similar applications and facts about financial problem toward Malaysian for a reference. From this research found that this application must be created to help Malaysian manage and planning their debt and bill and also give an advice on how to make a saving monthly. Within the research also, most of the existing application not really help Malaysian to manage and planning their money. This project will renew and using the rule based method to be carried out in this task. Before going on the project development, the flow chart is created for this new project to produce this project smoothly run and grow.

3.2 BACKGROUND OF SOFTWARE PROCESS MODEL

The Software Process Model can be defined as a simplified description of a software process that shows from a particular perspective. Actually, Software Process Model begins with a background and definition of traditional software life cycle model. The early software life cycle model was to provide a conceptual scheme for rationally managing the development of the software application. Process models may consist of activities which are part of the software product, software process and roles of people involved in software engineering. Software Process is a process model differs from a software method which called as software methodology. The importance of Software Process Model is to provide guidance on the phases, prototype and validation task which a project need to carry out its major task.

3.3 RAPID APPLICATION DEVELOPMENT (RAD) METHOD

Rapid Application Development (RAD) is one of the software process model or guideline to do the development. RAD was a response to non-agile processes developed in the 1970s, such as the waterfall model. RAD is a concept that applications can be transmitted rapidly and higher quality. RAD collects all the requirements using workshops or focus groups. Besides, it re-uses of software components of the existing system and prototyping in the early stage and repeatedly tests the user interface design. The problem is the previous method took so long time to build the application. For this project will prefer to use the RAD method because focus on building an application in a very short amount of time on the smaller project that can be launched quickly. (Wikipedia, 2008)

The advantages using RAD are such as:

a) It is elastic and adaptable to modifications.
b) The time needed to modernize the application is smooth by requirement analysis and preparation phase
c) It has also helped to estimate project costs.
d) It is can save a big amount of cost in term of project budget, time and cost due to the reusability of the prototypes.
e) It delivers a short development cycle thus users see the RAD product quickly

3.3.1 Rapid Application Development Phase

Figure 3.1 is Rapid Application Development Process that describes the flow of the software process model. For RAD the first phase is requirement Planning, second is User design, third is Construction is also known as implementation and lastly is cutover known as testing.

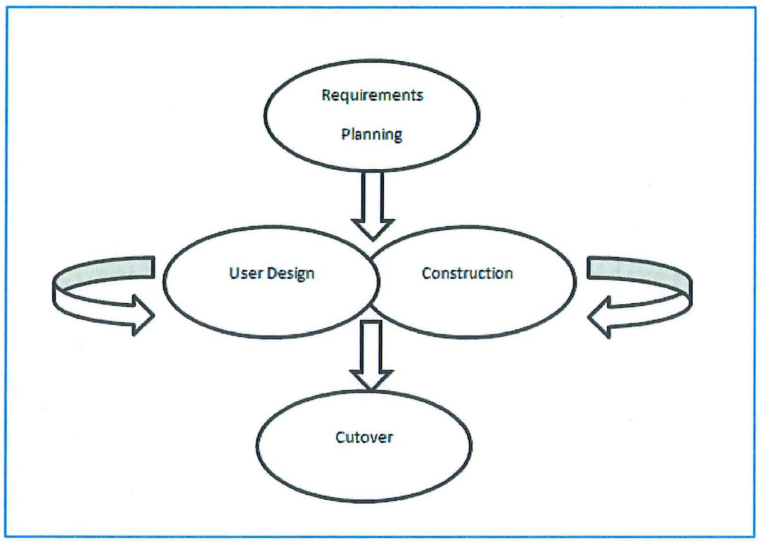


Figure 3.1: Rapid Application Development (RAD)

The methodology that is enforced in this project is Traditional Model. This Rapid Application Development (RAD) model advantage is to bring down development time. Second, can increase reusability of components. Third, Quick initial review takes place. Besides that, RAD also can encourage customer feedback. Moreover, this process model has 4 phase application procedure. That is Requirement Planning, User design, construction and cutover. All this phase includes all the activities and task that can support those requirements. (Wikipedia, 2008)

Definition of Rapid Application Development phases:

a) Requirement Planning Phase
   - At this phase, discuss on the Financial Planning Application needed, project scope and project requirement. Most of the requirement part was done in this phase.

b) User Design Phase
   - Develop design requirement of Personal Financial Planning Application with the process needed by diagram software tool, an interface software tool to produce the interactive process more understanding, modify and working model on client demands.

c) Construction Phase
   - This phase is known as development part, which needs to code the application to make it working properly.

d) Cutover Phase
   - To attain the application more effective, in this phase does a final task, including data conversion, testing, user training and the implementation of the application.

3.3.1.1 Requirement Planning Phase

In this project phase, the importance is to know overall of the project method and the flow of the project. The title and objective of the project need to achieve correctly to make this project successful. To be smoothly doing this project, the Gantt chart project has been produced to build certain the task is on agenda. Gantt chart can be a guideline to the developer to evolve the task based on the requirement stated in the Gantt chart. The Gantt chart of the project is provided in Appendix A.

3.3.1.1.1 Rule Assumption

At this point also, the project was started created after all the information on the concept ready. Such as, making the assumption rule, for example:

1= Yes, 0= No

Table 3.1: Example of Rule Assumption

Parent	PTPTN	House	Do you own a vehicle	Vehicle	Credit Card	Phone	Internet	Astro	Zakat	Insurance
1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	2	1	1	1	1	1	0
1	1	1	1	3	1	1	1	1	0	0
1	1	1	0	0	1	1	1	0	0	0

3.3.1.1.2 Calculation Information

According to (M. B. N. S. S. Bhd, 2013), (P. O. N. M. S. Bhd, 2013),(Selangor, 2010) and (Nasional, 2014) state that, the suitable calculation to all rule depend on the average salary. This formula created by referring many websites about the calculation or fee.

Example of calculation formula:

Table 3.2: Example of Calculation Information

Parent	PTPTN	House	Do you own a vehicle	Vehicle	Credit Card	Phone	Internet	Astro	Zakat	Insurance
10%	5%	15%	0	15%	10%	2.5%	2.5%	2.5%	2.5%	5%
10%	5%	15%	0	10%	10%	2.5%	2.5%	2.5%	2.5%	5%
10%	5%	15%	0	10%	10%	2.5%	2.5%	2.5%	2.5%	5%
10%	5%	15%	0	0	10%	2.5%	2.5%	2.5%	2.5%	5%

3.3.1.1.3 Logic Percentage Information

This percentage created based on the logic of the requirement to divide the element into the category on the figure 3.2:

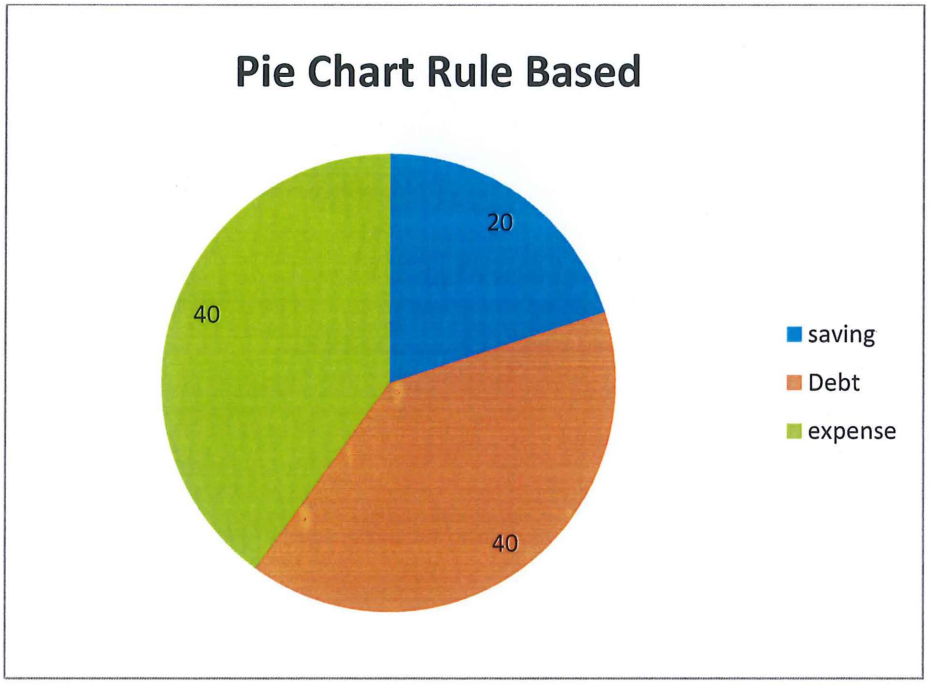


Figure 3.2: Pie Chart Assumption

The justification of this Pie Chart was describing the element for every part of the percentage in table 3.3:

Table 3.3: Example of Rule Category

percentage	**category**	**description**
20%	Saving	- Monthly saving, Tabung Haji, investment, Takaful, married.
40%	Debt	- Car loan, house loan, credit card, PTPTN.
40%	Expense	- House rent, house necessary. - Vehicle : Toll plaza , petrol, service - Parent present - Telephone: bill, credit - Internet - Shopping - zakat or Takaful

3.3.1.2 User Design Phase

At this phase, to create a model of the application requirement need to be prepared based on the technique needed. In this application, forward chaining is the selected technique which is performed or implemented in this project. Figure 3.3 is the forward chaining process in the application

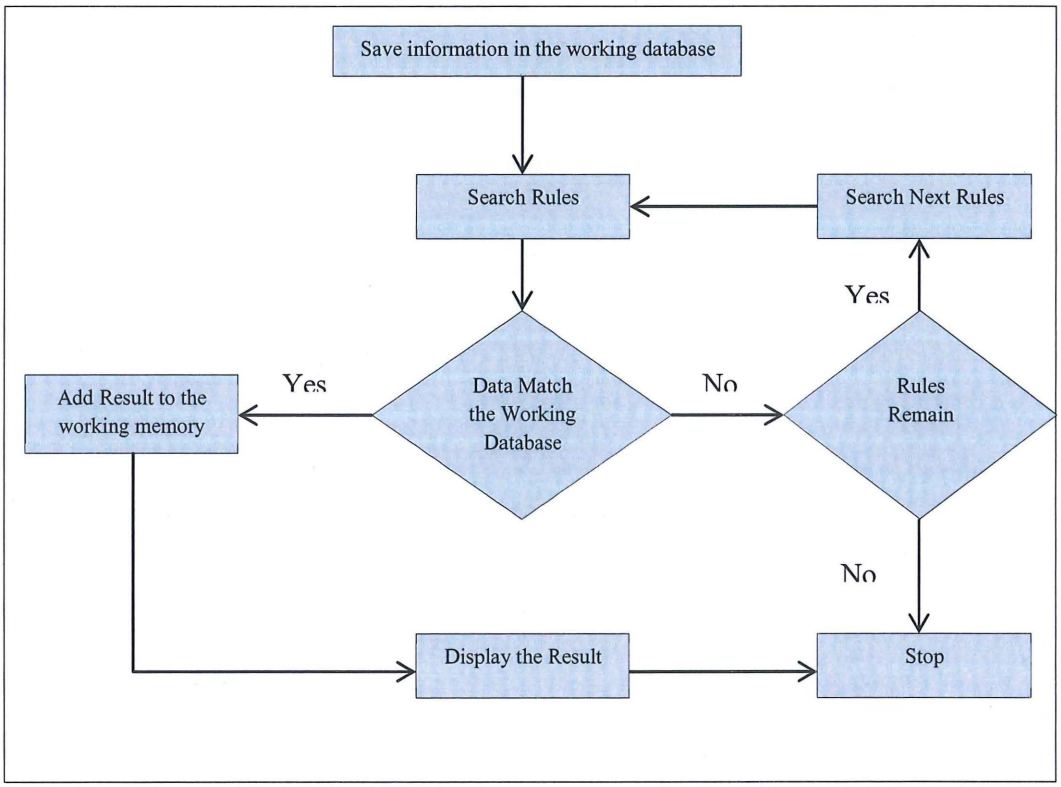


Figure 3.3 Forward Chaining Inference Process

Figure 3.4 is sample of rule based that have the requirement and the solution. Using if-then statement, this rule was figure out the solution in the database. Moreover, Flow chart is the basic diagram for every system that develops. A flow chart can describe the overall of the system flow from the user until the administrator. Figure 3.5; show the flow chart of the overall application.

```
RULE 1:

IF salary is less than RM 1000
AND Yes = "parent"
AND Yes = "PTPTN"
AND Yes = "house"
AND Yes = "car"
AND No = "motor"
AND No = "public"
AND Yes = "telephone"
AND Yes = "internet"
AND Yes = "ASTRO"
AND Yes = "credit card"
AND Yes = "zakat"
AND Yes = "other"
AND Yes = "Takaful"
THEN the financial is solution 1
```

Figure 3.4: Sample Rule Based of Personal Financial Planning Application Solution

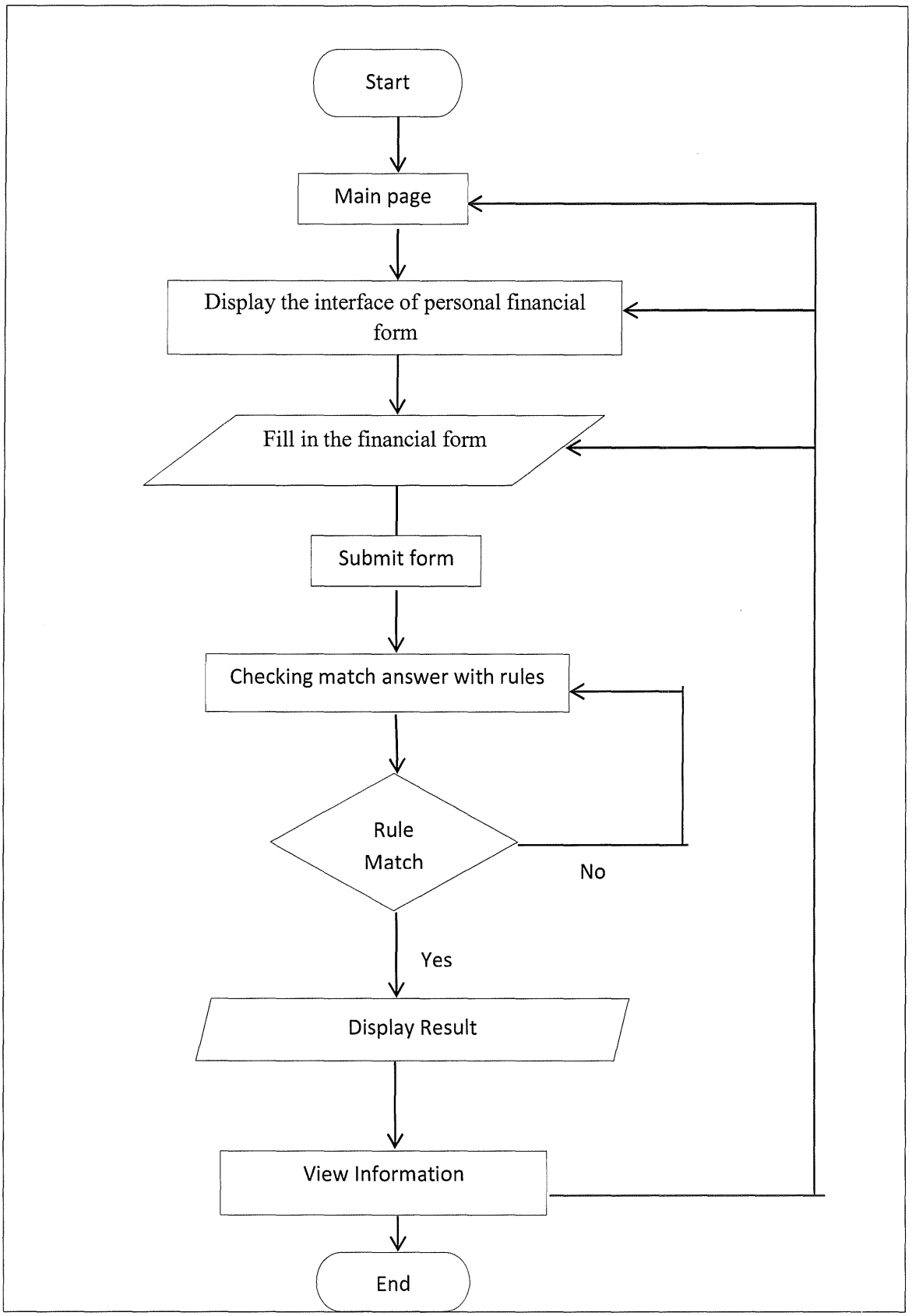


Figure 3.5: Flow Chart for Personal Financial Planning Application

3.3.1.2.1 Context Diagram

Context Diagram in software engineering is a diagram that represents the flow of the application and the sub application that could interact with the application. Figure 3.6 describes the Context diagram of this application that only has two requirements that is User and Administration.

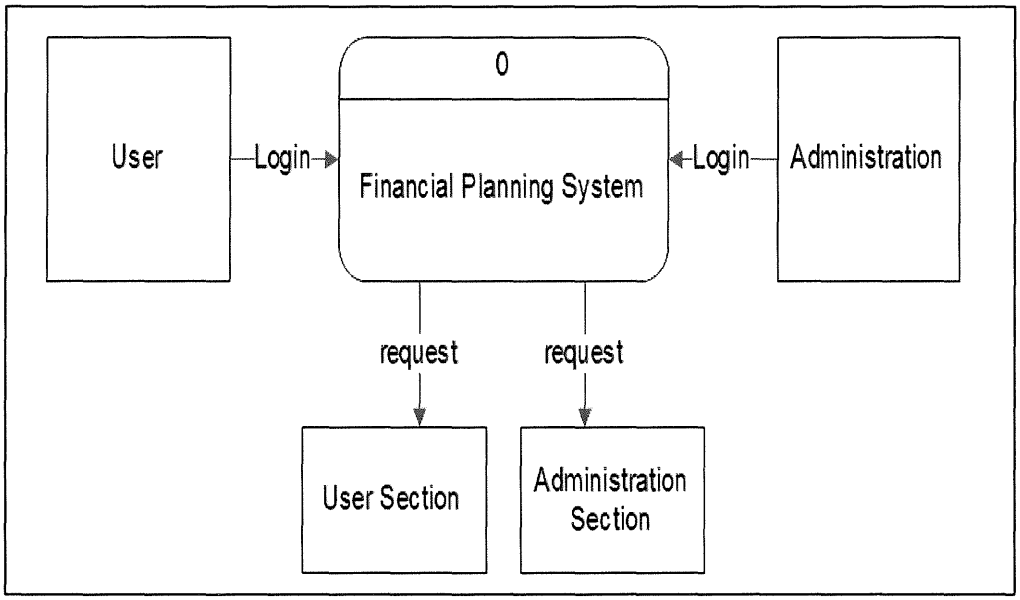


Figure 3.6: Context Diagram for Personal Financial Planning Application

3.3.1.2.2 Data Flow Diagram (DFD)

Data Flow Diagram is a sub application of every particular process in the application. Figure 3.7 shows the level 0 for Personal Financial Planning Application. Describe the user and admin section.

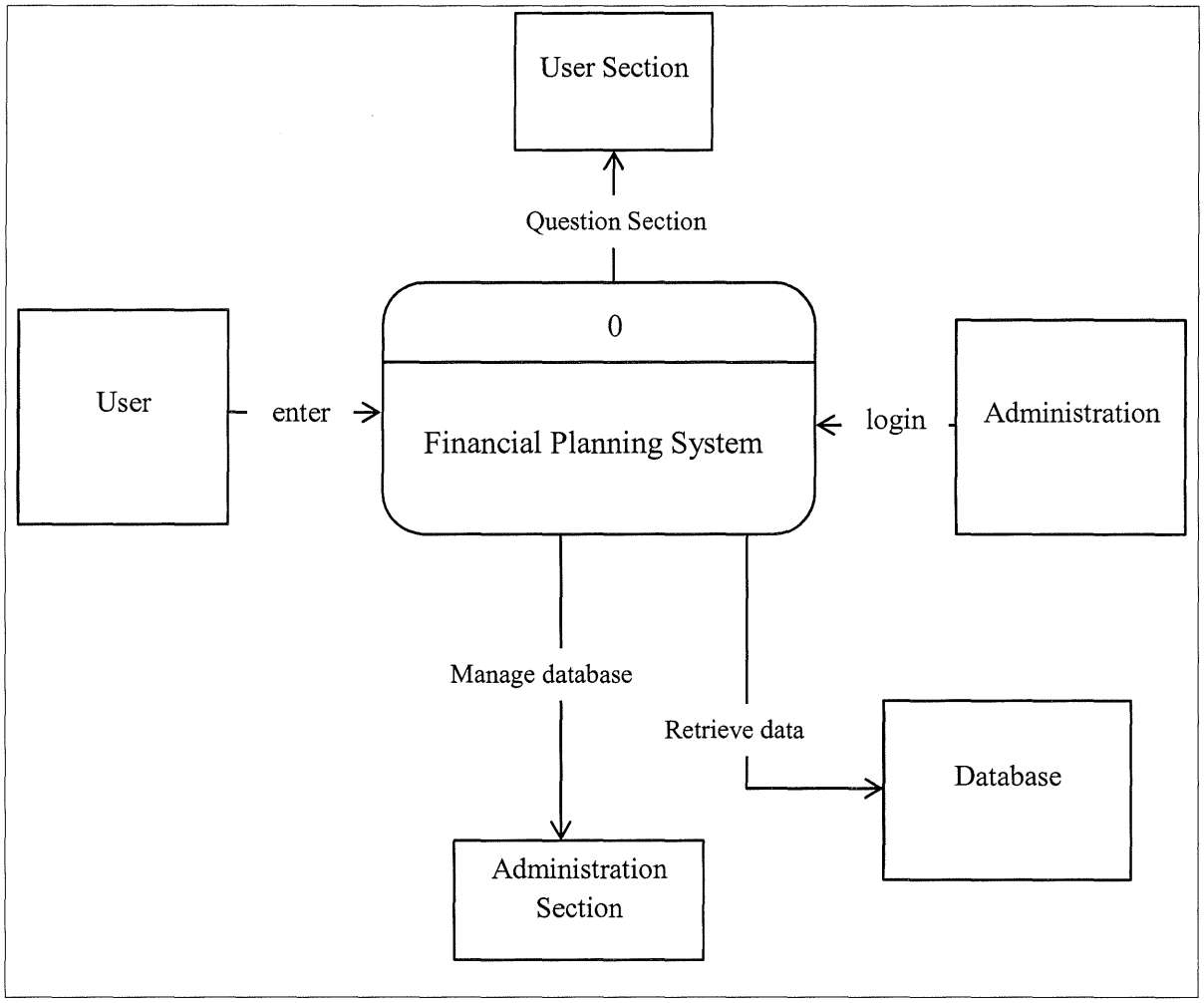


Figure 3.7: Data Flow Diagram Level 0 for Personal Financial Planning Application

Figure 3.8 shows the level 1 for Personal Financial Planning Application. Describe the admin section for login page that need to login with username and password.

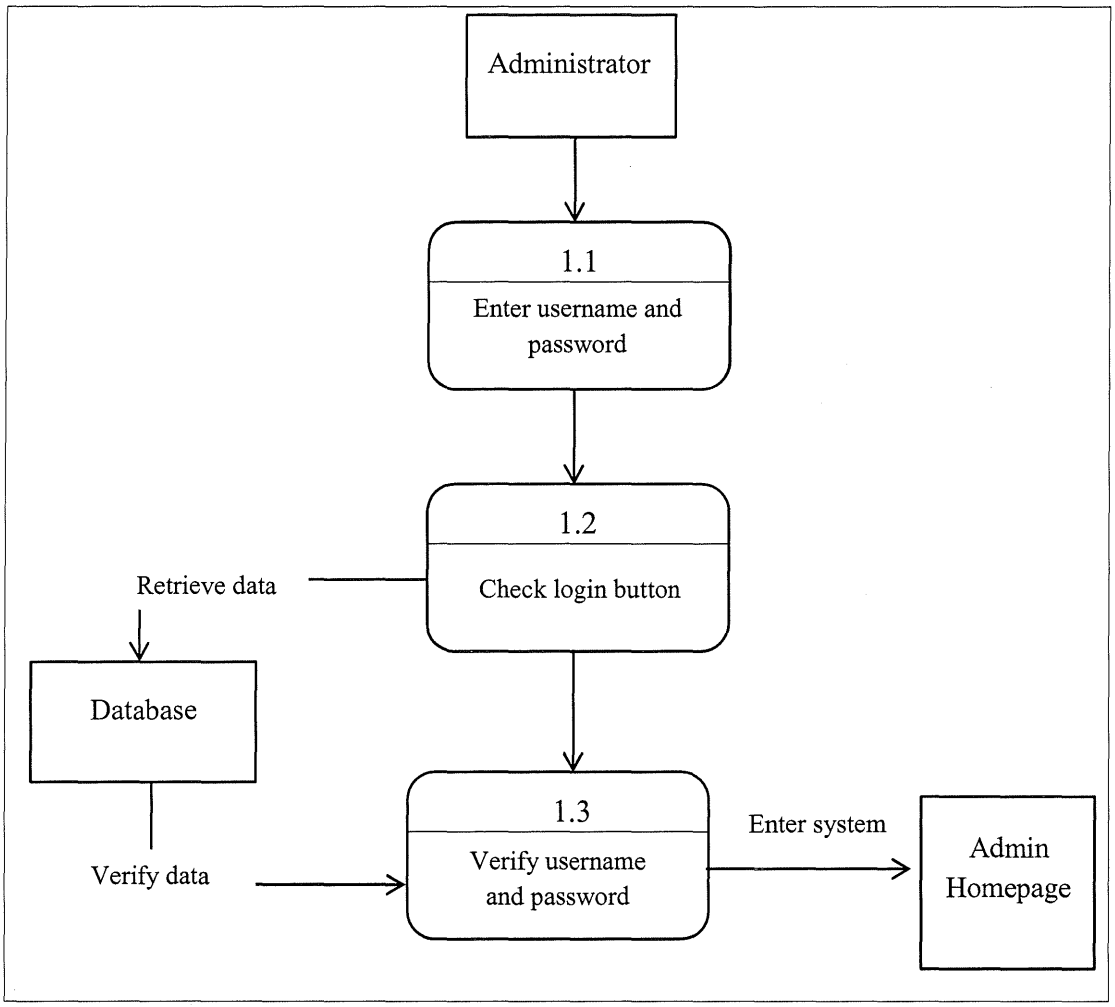


Figure 3.8: Data Flow Diagram for Login Section

Figure 3.9 shows the level 1 for User section Personal Financial Planning Application. Describe that flow user to answer the question and get the result.

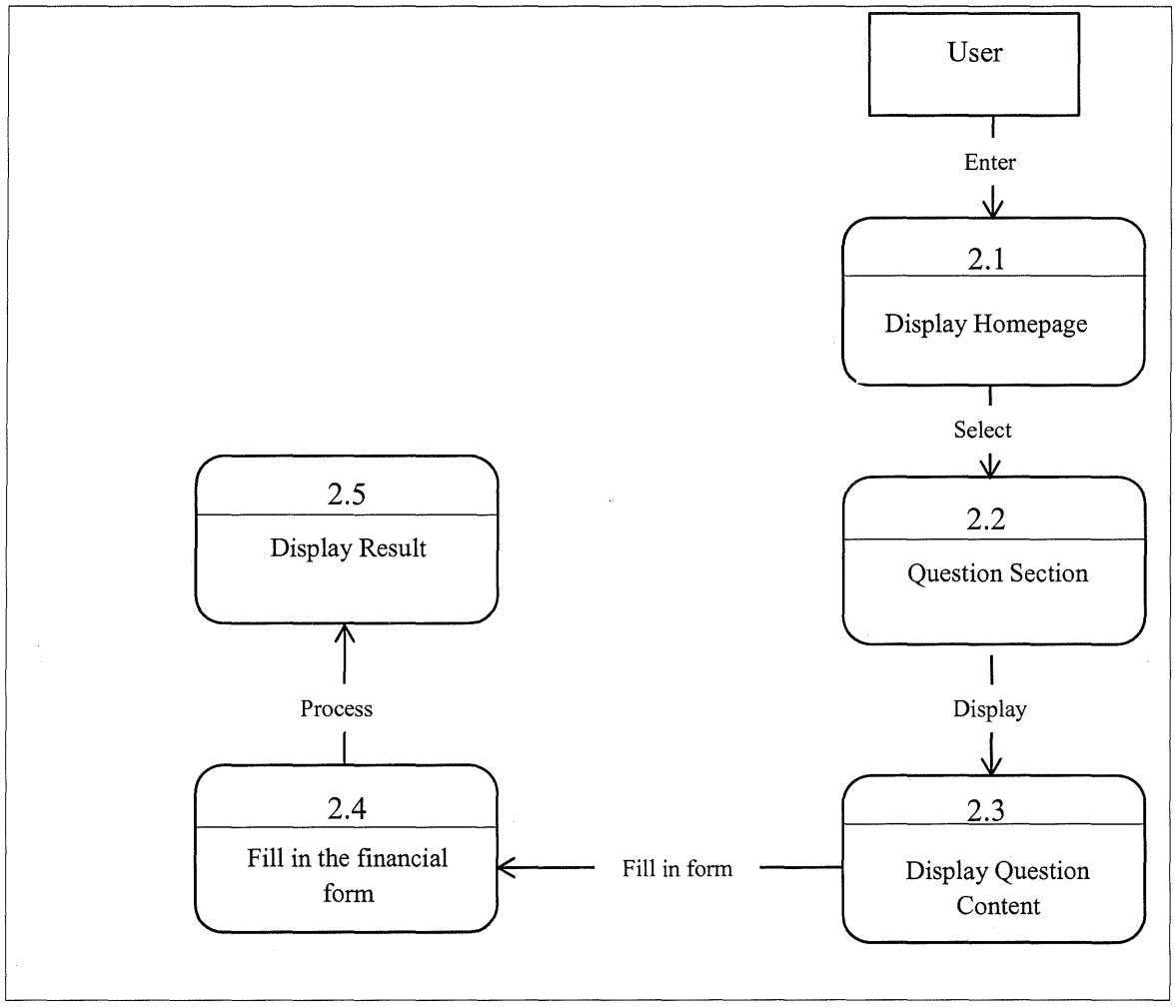


Figure 3.9: Data Flow Diagram for User Using the Personal Financial Planning Application

Figure 3.10 shows the level 1 for Administrator section Personal Financial Planning Application. Describe that the admin can change and update any rules for the application.

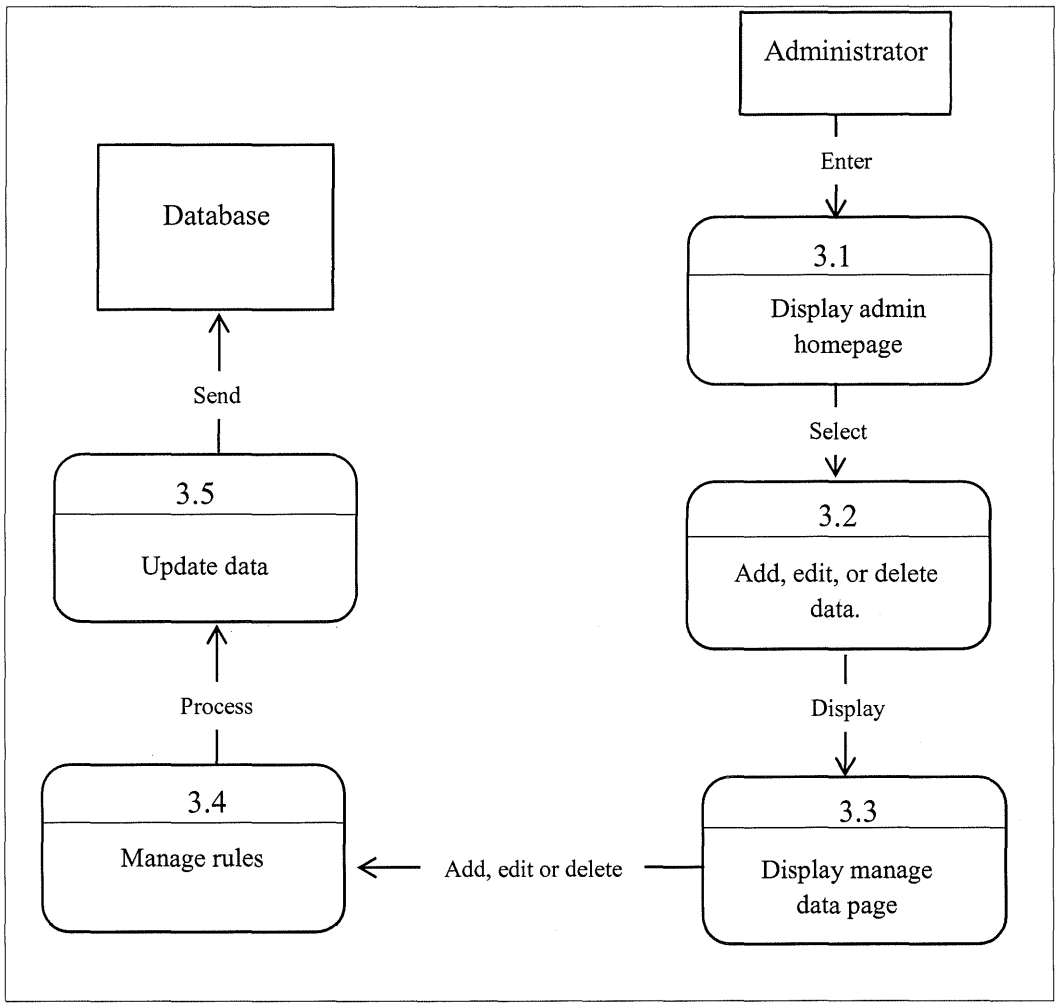


Figure 3.10: Data Flow Diagram for Administrator to Manage Database

3.3.1.2.3 Database Design

A database is a process of developing a database design or data model that met the user requirement. A decisions making is needed regarding to take some application in the real world. This database of Personal Financial Planning Application is consists of deciding the table and column that was contain in the table as well as the relationship between the table as shown at figure 3.11.

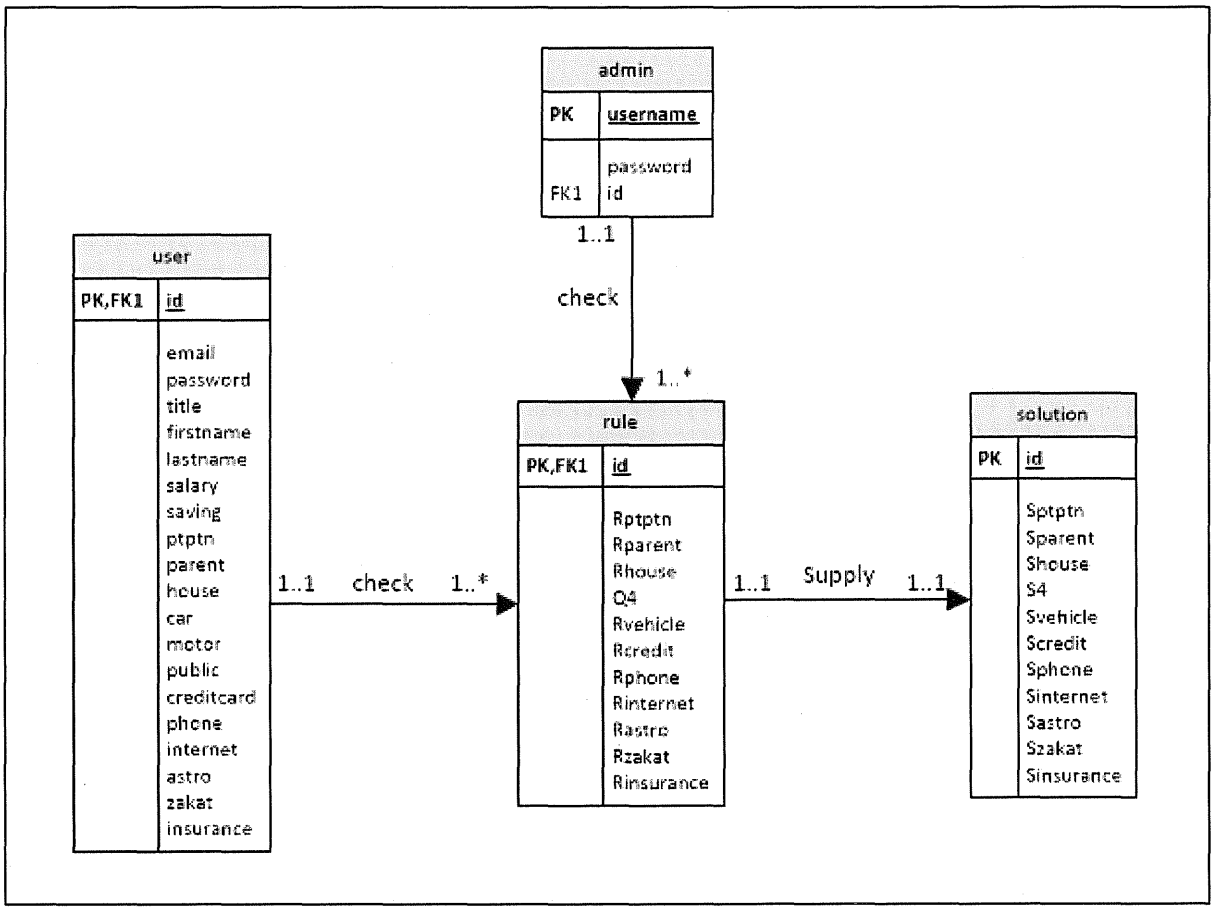


Figure 3.11: Entity Relation Diagram (ERD) Personal Financial Planning Application

3.3.1.2.4 Data Dictionary

Table 3.4: Data Dictionary for user

ATTRIBUTES	DESCRIPTIONS	CONSTRAINTS	PK/FK
id	Define user's ID	INTEGER(11)	PK,FK1
email	Define user's name	VARCHAR(100)	-
password	Define user's password	VARCHAR(255)	-
title	Define user's ID	VARCHAR(5)	-
firstname	Define user's first name	VARCHAR(255)	-
lastname	Define user's last name	VARCHAR(255)	-
salary	Define user's salary	VARCHAR(255)	-
saving	Define user's saving	VARCHAR(255)	-
ptptn	Define user's ptptn	VARCHAR(255)	-
parent	Define user's parent	VARCHAR(255)	-
house	Define user's housing	VARCHAR(255)	-
car	Define user's car	VARCHAR(255)	-
motor	Define user's motor	VARCHAR(255)	-
public	Define user's public transport	VARCHAR(255)	-
creditcard	Define user's credit card	VARCHAR(255)	-
phone	Define user's telephone	VARCHAR(255)	-
internet	Define user's internet	VARCHAR(255)	-
astro	Define user's astro	VARCHAR(255)	-
zakat	Define user's zakat or taxes	VARCHAR(255)	-
insurance	Define user's takaful or insurance	VARCHAR(255)	-

Table 3.5: Data Dictionary for Financial Rules

ATTRIBUTES	DESCRIPTIONS	CONSTRAINTS	PK/FK
id	Define rule's ID	INTEGER(11)	PK,FK1
Rptptn	Define rule's ptptn	INTEGER(5)	-
Rparent	Define rule's parent	INTEGER(5)	-
Rhouse	Define rule's housing	INTEGER(5)	-
Q4	Define rule's do have vehicle if yes =1 , no = 0.	INTEGER(5)	-
Rvehicle	Define rule's type of vehicle (1 = car , 2 = motor , 3 = public transport)	INTEGER(5)	-
Rcredit	Define rule's credit card	INTEGER(5)	-
Rphone	Define rule's telephone	INTEGER(5)	-
Rinternet	Define rule's internet	INTEGER(5)	-
Rastro	Define rule's astro	INTEGER(5)	-
Rzakat	Define rule's zakat or taxes	INTEGER(5)	-
Rinsurance	Define rule's takaful or insurance	INTEGER(5)	-

Table 3.6: Data Dictionary for Financial Solutions

ATTRIBUTES	DESCRIPTIONS	CONSTRAINTS	PK/FK
id	Define solution's ID	INTEGER(11)	PK
Sptptn	Define solution's ptptn	VARCHAR(255)	-
Sparent	Define solution's parent	VARCHAR(255)	-
Shouse	Define solution's housing	VARCHAR(255)	-
S4	Define solution's do have vehicle	VARCHAR(255)	-
Svehicle	Define solution's do have vehicle (0.15 = car , 0.1 = motor & public)	VARCHAR(255)	-
Scredit	Define solution's credit card	VARCHAR(255)	-
Sphone	Define solution's telephone	VARCHAR(255)	-
Sinternet	Define solution's internet	VARCHAR(255)	-
Sastro	Define solution's astro	VARCHAR(255)	-
Szakat	Define solution's zakat or taxes	VARCHAR(255)	-
Sinsurance	Define solution's takaful or insurance	VARCHAR(255)	-

Table 3.7: Data Dictionary for Admin

ATTRIBUTES	DESCRIPTIONS	CONSTRAINTS	PK/FK
Username	Define admin's username	VARCHAR(255)	PK
Password	Define admin's password	VARCHAR(255)	-
Rule_id	Define rule's id	INTEGER(11)	FK1

3.3.1.3 Construction Phase

At this construction phase, a prototype is built using the software tool. For example, for Personal Financial Planning Application are using Microsoft Dreamweaver as interface and using PHP to make the application run nicely. Initial prototype needed consist of screens, forms, report and other elements of the user interfaces. For Personal Financial Planning Application, the prototype is based on the application requirement.

3.3.1.4 Cutover Phase

This is an implementation phase that all actions are needed. In this phase need to have a testing with the user, installing the application and completing the necessary documentation.

3.3.1.5 Comparison Between Software Process Development

Table 3.8: Comparison of Software Process Development

	RAD	**WATERFALL**	**ITERATIVE AND INCREMENTAL DEVELOPMENT**	**V-MODEL**
Process	-Requirement Planning -User Design -Construction	-Requirements -Design - Implementation	-Planning -Requirement -Analysis and design	-Concept of operations -Require and architecture

	-Cutover	-Verification -Maintenance	-Implementation -Testing -Evaluation	-Detailed design -Implementation -Integration, test and verification -Application verification and validation -Operation and maintenance
Advantages	-can handle large project with confidence. -flexible and easy to changes	-easier for new developer to more clear with waterfall -better understanding required documentation for every stage	-Versions are provided after each iteration - first priority, customer need that does not affect other development such a core project	-simple and easy to use this software process -easier to find defect in early stage
Disadvantages	-not suitable for small project -not appropriate the technical risk	- changes are not possible to back to pass phase if have any mistakes -need to maximize the communication either at the beginning or at the end of the development	- every phase of iteration is strict and cannot overlap another phases - Not easy to identify common software facilities.	-very rigid and least flexible -if has any changes, need to updated all test documents and requirement documentation.

3.3.2 Development tools

3.3.2.1 Hardware tools

Hardware is a device that is physically connected to your computer or something that can be physically touched. An example, refers to physical part or components a computer, such as monitor, hard drive disk, printers, mouse and etc. without any hardware, computer would not exits and software would not be capable to play.

Table 3.9: Hardware Tool of Personal Financial Planning Application

Computer Hardware	**Quantity**	**Purpose**
Notebook Dell INSPIRON N2040	1	Source code typing and complete the project documentation
Processor – Intel Pentium	1	Program in notebook
Thumb drive	1	Storage medium
Printer Canon LBP3010	1	Printing documentation
mouse	1	Make easier and faster work

3.3.2.2 Software tools

Software means computer instructions or data that can be stored electronically in software computer. It enables a user to interact with the computer or have the specific task. In additional, software can separate into two classes. First, application software which the programs that do work users are directly interested in, for example, word processors, database management and spreadsheets. Second is application software which includes operating an application and all the utilities that enable the function.

Table 3.10: Software Tool of Personal Financial Planning Application

Computer Software	**Purpose**
Windows 7 Professional	Operating Application of the computer
Microsoft Word 2012	For documentation
Microsoft Power Point 2012	For Presentation
Microsoft Project 2007	Gant Chart of the project
Dreamweaver 8	For design interface and coding
MySQL Database	Create database
XAMPP	Medium of the cod running
PhpMyAdmin	Database management application
Google Chrome	Information, Reading, Note searching
Mozilla Firefox	To test and debug prototype design
Visual Paradigm for UML 8.3 Community Edition	To design the diagram

DESIGN AND IMPLEMENTATION

4.1 Introduction

This chapter describes the development and implementation process of Personal Financial Planning Using Rule Based Expert System. The purpose of this chapter is to study the development process and the functionality of the application. This chapter will discuss the graphical user interface and also the admin page with the explanation of each functionality of this system.

4.2 Software Development Tools of Personal Financial Planning Using Rule Based Expert System

This application was developed by using Notepad++ and XAMPP. Microsoft Windows was the operating system that was used to interact with the internet browser such as Internet Explorer, Mozilla Firefox and Google Chrome. The main objective to develop this system is to guide user to manage and plan their financial income in a month and for the future by giving a suggestion spending scale based on AKPK solution.

4.3 System Development Process

This section describes the development process of the Personal Financial Planning Using Rule Based Expert System function. Figure 3.5 (refer to the previous chapter) shows the flow of this system from the beginning until the end of the process when the user uses the application.

4.4 System Interface

The interface for Personal Financial Planning application is displayed below. The application includes the home page, vision & mission, financial info, budget calculator, contact us, login page, signup page, analyse page, suggestion page, admin home page, admin add rule and solution page, and admin update rule and solution page.

Figure 4.1 shows the home page of this application. In this page, the Personal Financial Planning application is introduced.

Figure 4.1: index.php

Figure 4.2 shows the vision and mission for developing this Personal Financial Planning Application upon click.

Figure 4.2: mission.php

Figure 4.3 shows the scopes for developing this Personal Financial Planning Application upon click.

Figure 4.3: info.php

In Figure 4.4, the budget calculator page is shown where the user is allowed to key in their information to produce a result and suggestion by clicking the button "Save & Analyse Now!". Furthermore, budget calculators will auto control the user's key in data where the users are allowed to key in value or integer only. The system will auto delete the character or alphabet when users key in data to avoid any error from happening while generating a suggestion.

Figure 4.4: calculator.php

Figure 4.5 shows the result page of the system. In this page the system produced a result based on the previous page (calculator.php) user's key in information. By clicking the button "Suggestion", the system will generate the suggestion in a table and pie chart form. In this analyzed page, it was developed using CSS to show the green and red colour to make the user interface more interesting and to have the analyzed suggestion more easily understood.. The red color which means damage or not stable and the green color means peace or stable.

Figure 4.5: result.php

Figure 4.6 shows the suggestion page of the system. This page displays the suggestion in table and pie chart form. This suggestion page uses Google source of Pie Chart and CSS to develop the table. To make this suggestion more clear and understandable for the user, the table of suggestion shows the user's spending in comparison to the suggested spending in order to allow user understand and plan their income from the suggestion table. The suggestion Pie Chart also makes the suggestion result more interesting and readable for user.

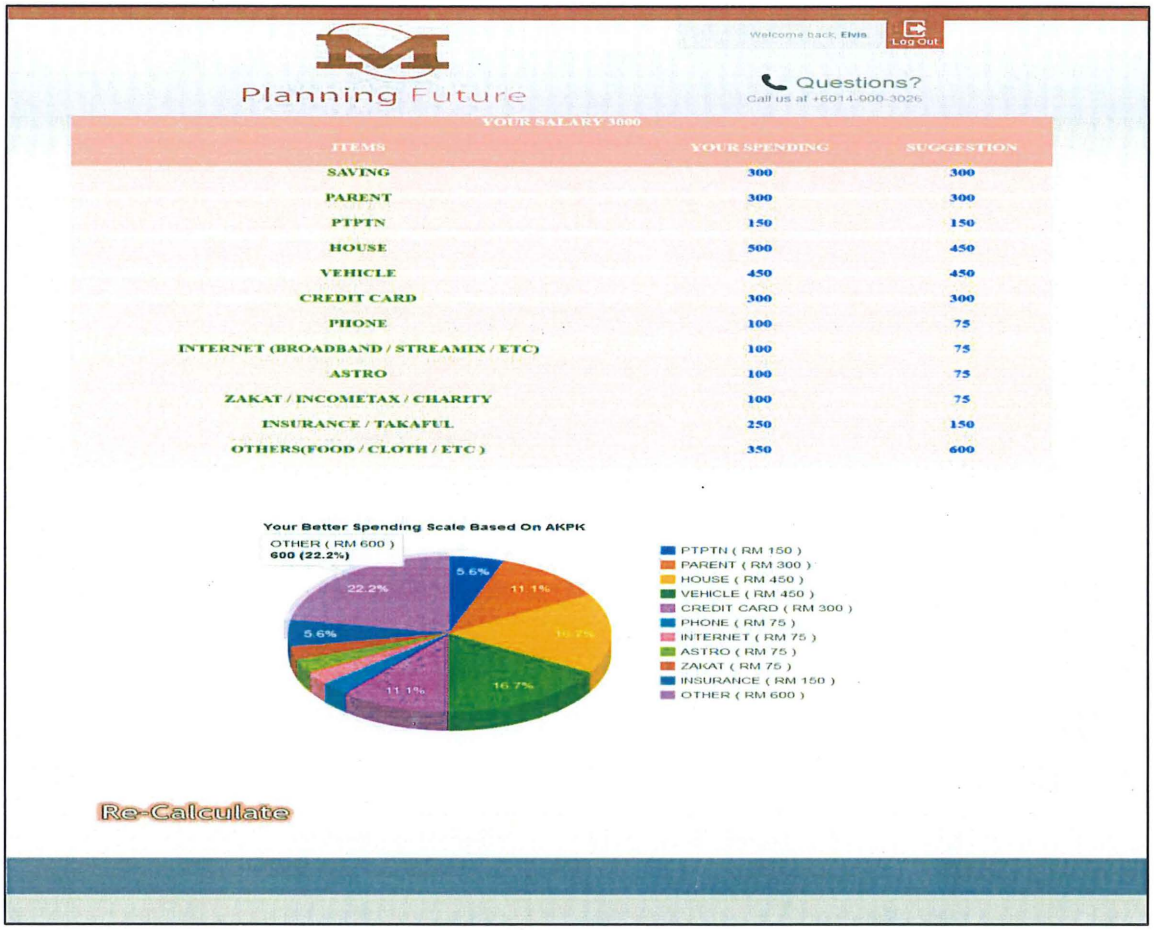


Figure 4.6: analyse.php

In Figure 4.7, the contact us page of the system is shown. This page displays the contact person phone number, fax number, email and company address.

Figure 4.7: contactus.php

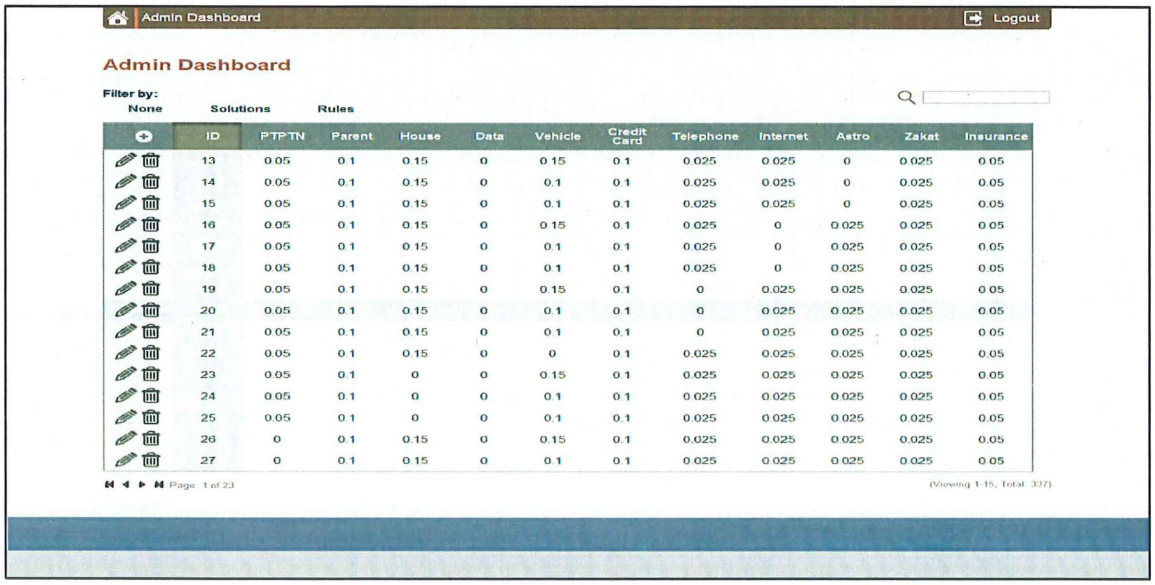
Figure 4.8 shows the login page. In this page, the user needs to key in the information required to log in. Incorrect email or password will disallow user from logging into this system. A username and password is required for the administrator; key in "admin" for the username and "adminpassword" for the password.

Figure 4.8: login.php

Figure 4.9 shows the signup page of the system. In this page user need to fill in the required information to sign up.

Figure 4.9: signup.php

In Figure 4.10 show the solution and admin main page. In this page the admin needs to login as the admin with the username "admin" and password "adminpassword". This is the admin main page that displays the solutions for Personal Financial Planning Application.



ID	PTPTN	Parent	House	Data	Vehicle	Credit Card	Telephone	Internet	Astro	Zakat	Insurance
13	0.05	0.1	0.15	0	0.15	0.1	0.025	0.025	0	0.025	0.05
14	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0	0.025	0.05
15	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0	0.025	0.05
16	0.05	0.1	0.15	0	0.15	0.1	0.025	0	0.025	0.025	0.05
17	0.05	0.1	0.15	0	0.1	0.1	0.025	0	0.025	0.025	0.05
18	0.05	0.1	0.15	0	0.1	0.1	0.025	0	0.025	0.025	0.05
19	0.05	0.1	0.15	0	0.15	0.1	0	0.025	0.025	0.025	0.05
20	0.05	0.1	0.15	0	0.1	0.1	0	0.025	0.025	0.025	0.05
21	0.05	0.1	0.15	0	0.1	0.1	0	0.025	0.025	0.025	0.05
22	0.05	0.1	0.15	0	0	0.1	0.025	0.025	0.025	0.025	0.05
23	0.05	0.1	0	0	0.15	0.1	0.025	0.025	0.025	0.025	0.05
24	0.05	0.1	0	0	0.1	0.1	0.025	0.025	0.025	0.025	0.05
25	0.05	0.1	0	0	0.1	0.1	0.025	0.025	0.025	0.025	0.05
26	0	0.1	0.15	0	0.15	0.1	0.025	0.025	0.025	0.025	0.05
27	0	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0.025	0.05

Page 1 of 23 (Viewing 1-15, Total 337)

Figure 4.10: dashboard.php

Figure 4.11 shows the rule's page. By clicking the button "Rules", the page will display all the rules in the database. This system also provides a search function in which the admin can search rule by id to make it easier to trace the rule.

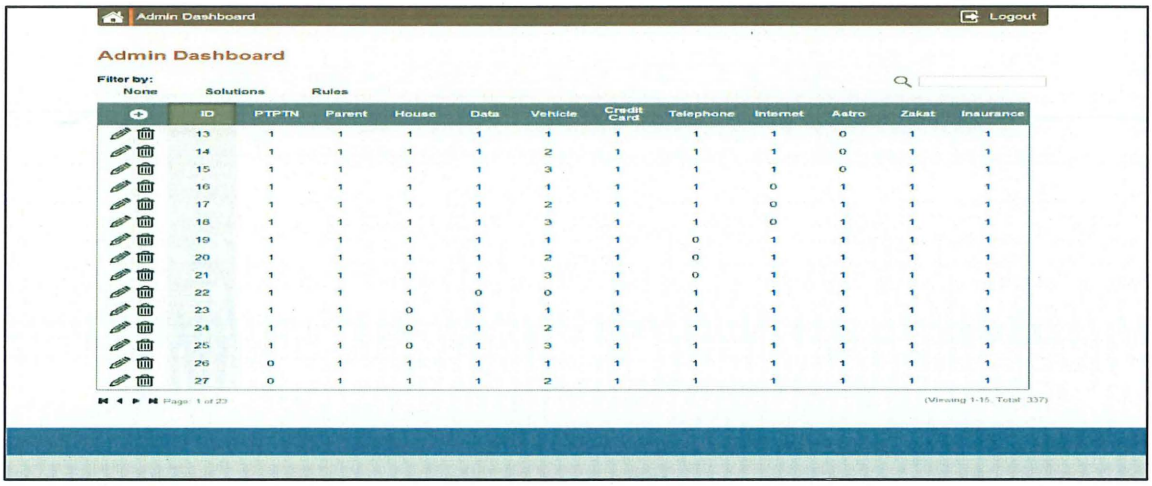


Figure 4.11: rule.php

In Figure 4.12, the add rule and solution page is shown. By clicking the picture button "plus" in the admin main page, the add rule and solution page will be displayed. The admin can add a new rule and solution in this page. This add rule and solution page will automatically delete the character or alphabet when the admin keys in data.

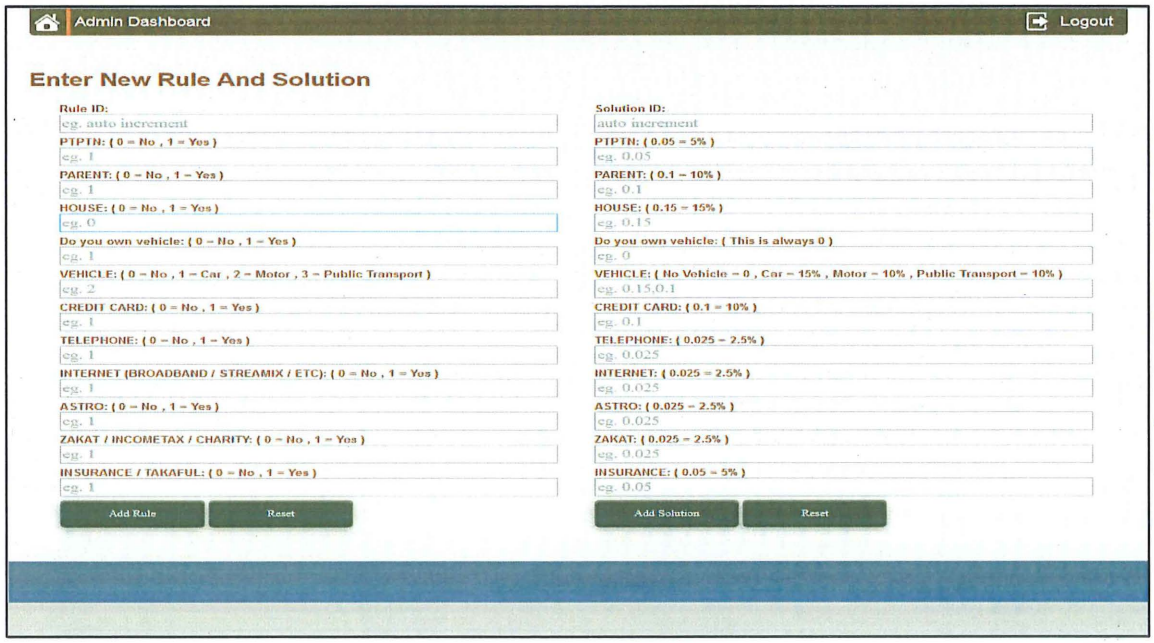


Figure 4.12: add.php

Figure 4.13 shows the edit rule and solution page. Clicking the picture button "pencil" in the admin main page will display this edit rule and solution page where the admin can edit the rule and solution, based on the id that is selected by admin. This edit rule and solution page also provides the function "Revert" in which the admin can retrieve the original data if necessary.

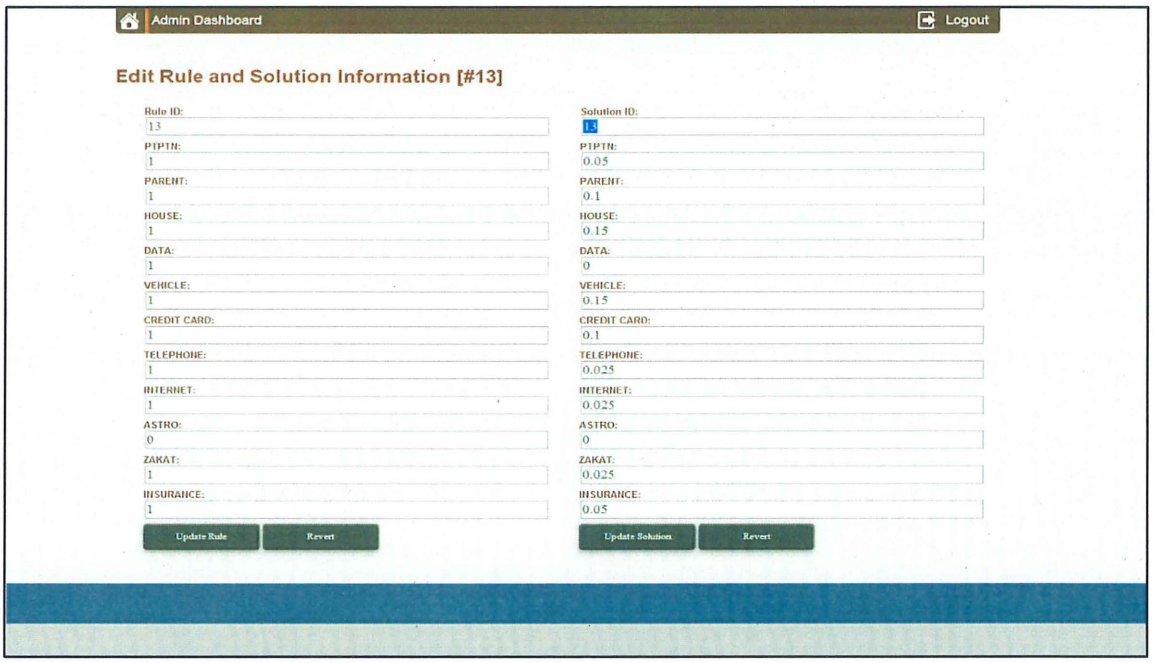


Figure 4.13: edit.php

Figure 4.14 shows the PHP coding that retrieves user key in data from the page calculator.php.

```
<?php
include("db.php");

$PTPTN = (isset($_GET['PTPTN']) ? $_GET['PTPTN'] : null);
$Parent =(isset($_GET['Parent']) ? $_GET['Parent'] : null);
$House =(isset($_GET['House']) ? $_GET['House'] : null);
$data =(isset($_GET['data']) ? $_GET['data'] : null);
$data1 =(isset($_GET['data1']) ? $_GET['data1'] : null);
$CreditCard =(isset($_GET['CreditCard']) ? $_GET['CreditCard'] : null);
$Phone=(isset($_GET['Phone']) ? $_GET['Phone'] : null);
$Internet =(isset($_GET['Internet']) ? $_GET['Internet'] : null);
$Astro =(isset($_GET['Astro']) ? $_GET['Astro'] : null);
$Zakat =(isset($_GET['Zakat']) ? $_GET['Zakat'] : null);
$Insurance =(isset($_GET['Insurance']) ? $_GET['Insurance'] : null);
$Salary=(isset($_GET['Salary']) ? $_GET['Salary'] : null);
$Motor=(isset($_GET['Motor']) ? $_GET['Motor'] : null);
$Car=(isset($_GET['Car']) ? $_GET['Car'] : null);
$Public=(isset($_GET['Public']) ? $_GET['Public'] : null);
$name=(isset($_GET['name']) ? $_GET['name'] : null);
```

Figure 4.14: php coding to retrieve user key in data.

Figure 4.15 shows the PHP coding that is checking the rules from database if exists then produced result. There are two tables joining to produce the result, the rule table and the solution table are joined together signifying rule 1 is equal to solution 1.

```
$query = "SELECT tb2.Sptptn , tb2.Sparent , tb2.Shouse , tb2.S4 , tb2.Svehicle , tb2.Scredit , tb2.Sphone , tb2.Sinternet , tb2.Sastro , tb2.Szakat, tb2.Sinsurance
FROM rule AS tb1 INNER JOIN solution AS tb2
ON tb1.id = tb2.id
WHERE tb1.Rptptn='$PTPTNV' AND tb1.Rparent='$ParentV' AND tb1.Rhouse='$HouseV' AND tb1.Q4='$data' AND tb1.Rvehicle='$VehicleV' AND tb1.Rcredit='$CreditCardV'
AND tb1.Rphone='$PhoneV' AND tb1.Rinternet='$InternetV' AND tb1.Rastro='$AstroV' AND tb1.Rzakat='$ZakatV' AND tb1.Rinsurance='$InsuranceV'";
$result= mysql_query($query) or die(mysql_error());
```

Figure 4.15: php coding to check rule exist

In figure 4.16 shows the PHP coding that checks the user's key in information. Zero means no spending for a particular item and spending for a particular item exists if otherwise.

```
if (trim($_GET['Zakat']) == 0)
{
    $ZakatV = 0;
}else{
    $ZakatV = 1;
}

if (trim($_GET['Car']) == 0 && trim($_GET['Motor']) == 0 && trim($_GET['Public']) == 0)
{
    $data = 0;
}else{
    $data = 1;
}

if (trim($_GET['Car']) == 0 && trim($_GET['Motor']) == 0 && trim($_GET['Public']) == 0)
{
    $VehicleV = 0;
}else if(trim($_GET['Car']) != 0 && trim($_GET['Motor']) == 0 && trim($_GET['Public']) == 0)
{
    $VehicleV = 1;
}else if(trim($_GET['Car']) == 0 && trim($_GET['Motor']) != 0 && trim($_GET['Public']) == 0)
{
    $VehicleV = 2;
}else if(trim($_GET['Car']) == 0 && trim($_GET['Motor']) == 0 && trim($_GET['Public']) != 0)
{
    $VehicleV = 3;
}else{
    $VehicleV = 1;
}
```

Figure 4.16: php coding to checking user key in information.

Figure 4.17 shows the PHP coding that displays the result if the rule exists and will display a "SORRY! This rule does not create yet".

```
<?php
        if (mysql_num_rows($result)<1)
        {
            echo "SORRY ! This rule do not created yet";
        }else{
            while ($query=mysql_fetch_array($result))
            {
                $Saving = 10/100 * $Salary;
                $Sptptn = $query['Sptptn']*$Salary;
                $Sparent = $query['Sparent']*$Salary;
                $Shouse = $query['Shouse']*$Salary;
                $S4 = $query['S4']*$Salary;
                $Svehicle = $query['Svehicle']*$Salary;
                $Scredit = $query['Scredit']*$Salary;
                $Sphone = $query['Sphone']*$Salary;
                $Sinternet = $query['Sinternet']*$Salary;
                $Sastro = $query['Sastro']*$Salary;
                $Szakat = $query['Szakat']*$Salary;
                $Sinsurance = $query['Sinsurance']*$Salary;
                $other =$Salary - $Saving-$Sptptn-$Sparent-$Shouse-$S4-$Svehicle-$Scredit-$Sphone-$Sinternet-$Sastro-$Szakat-$Sinsurance;
                $total =$Saving+$Sptptn+$Sparent+$Shouse+$S4+$Svehicle+$Scredit+$Sphone+$Sinternet+$Sastro+$Szakat+$Sinsurance+$other;
                $balance = $Salary-$Saving-$ptptn-$parent-$house-$vehicle-$creditcard-$phone-$internet-$astro-$zakat-$insurance;

                $ptptn = trim($_GET['PTPTN']);
                $parent = trim($_GET['Parent']);
                $house = trim($_GET['House']);
                $car = trim($_GET['Car']);
                $motor = trim($_GET['Motor']);
                $public = trim($_GET['Public']);
                $creditcard = trim($_GET['CreditCard']);
                $phone = trim($_GET['Phone']);
                $internet = trim($_GET['Internet']);
                $astro = trim($_GET['Astro']);
                $zakat = trim($_GET['Zakat']);
```

Figure 4.17: php coding to display the result.

In Figure 4.18 shows the PHP coding that sets the condition for displaying the result. For example, zero on house and less than suggestion will then display "Your spending on HOUSE (RM 300) is GOOD".

```
if ($ptptn == 0){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='green'>OKAY</font> IF you don't have Education Loan / PTPTN</b>"."</br></br>";
} elseif ($ptptn >= $query['Sptptn']*$Salary && $ptptn < $query['Sptptn']*$Salary*1.1){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='green'>OKAY</font></b>"."</br></br>";
} elseif ($ptptn >= $query['Sptptn']*$Salary*1.1 && $ptptn < $query['Sptptn']*$Salary*1.3){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='red'>HIGH</font></b>"."</br></br>";
} elseif ($ptptn >= $query['Sptptn']*$Salary*1.3){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='red'>TOO HIGH</font></b>"."</br></br>";
} elseif ($ptptn >= 1 && $ptptn < $query['Sptptn']*$Salary) {
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='red'>NOT ENOUGH</font></b>"."</br></br>";
}

if ($parent == 0){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>TOO STINGY</font></b>"."</br></br>";
} elseif ($parent >= 0 && $parent <= $query['Sparent']*$Salary*0.5){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>TOO STINGY</font></b>"."</br></br>";
} elseif ($parent > $query['Sparent']*$Salary*0.5 && $parent < $query['Sparent']*$Salary){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>STINGY</font></b>"."</br></br>";
} elseif ($parent >= $query['Sparent']*$Salary && $parent < $query['Sparent']*$Salary*1.5){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='green'>ACCEPTABLE</font></b>"."</br></br>";
} elseif ($parent >= $query['Sparent']*$Salary*1.5 && $parent < $query['Sparent']*$Salary*2.0){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>HIGH</font></b>"."</br></br>";
} elseif ($parent >= $query['Sparent']*$Salary*2.0){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>TOO HIGH</font></b>"."</br></br>";
}


if ($house == 0){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='green'>GOOD</font></b>"."</br></br>";
} elseif ($house >= 0 && $house < $query['Shouse']*$Salary){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='green'>GOOD</font></b>"."</br></br>";
} elseif ($house >= $query['Shouse']*$Salary && $house < $query['Shouse']*$Salary*1.1){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='green'>OKAY</font></b>"."</br></br>";
} elseif ($house >= $query['Shouse']*$Salary*1.1 && $house < $query['Shouse']*$Salary*1.3){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='red'>HIGH</font></b>"."</br></br>";
} elseif ($house >= $query['Shouse']*$Salary*1.3){
```

Figure 4.18: php coding to set condition for display result.

4.5 Database Construction

Personal Financial Planning Using Rule Based Expert System has 3 connection tables on cb11091 database; Table rule, solution and user. This database is connected by using PHPMYAdmin MySQL.

127.0.0.1 » cb11091

Structure | SQL | Search | Query | Export | Import | Operations | Privileges | Routines

Table	Action	Rows	Type	Collation	Size	Overhead
rule	Browse Structure Search Insert Empty Drop	337	InnoDB	latin1_swedish_ci	48 KiB	-
solution	Browse Structure Search Insert Empty Drop	337	InnoDB	latin1_swedish_ci	48 KiB	-
user	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 KiB	-
3 tables	Sum	675	InnoDB	latin1_swedish_ci	112 KiB	0 B

Figure 4.19: List of table create in PHPMyAdmin

+ Options

	id	email	password	title	firstname	lastname	salary	saving	ptptn	parent	house	car	motor	public	house	car	motor	public	creditcard	phone	internet	astro	zakat	insurance
Edit Copy Delete	1	elvis@hotmail.com	e10adc3949ba59abbe56e057f20f883e	mr	Elvis	JC	3000	300	150	300	500	300	150	0	500	300	150	0	300	100	100	100	100	250

Figure 4.20: Table for User

Description: Figure 4.20 shows the users database table upon user's signup of an account. User is must fill in email address, password, title, first name and last name. When login time the system will display the user's first name. The user's password was recorded as encripted data using md5. New registration for user will have the system automatically set the salary, saving ptptn, parent, house car, motor, public, credit card, phone, internet, astro, zakat and insurance equal to zero. User is required to key in their own spending when users want to acquire analysis and suggestion.

127.0.0.1 » cb11091 » rule

Browse | Structure | SQL | Search | Insert | Export | Import | Operations | Tracking

←T→	id	Rptptn	Rparent	Rhouse	Q4	Rvehicle	Rcredit	Rphone	Rinternet	Rastro	Rzakat	Rinsurance
Edit Copy Delete	1	1	1	1	1	1	1	1	1	1	1	1
Edit Copy Delete	2	1	1	1	1	2	1	1	1	1	1	1
Edit Copy Delete	3	1	1	1	1	3	1	1	1	1	1	1
Edit Copy Delete	4	1	1	1	1	1	1	1	1	1	1	0
Edit Copy Delete	5	1	1	1	1	2	1	1	1	1	1	0
Edit Copy Delete	6	1	1	1	1	3	1	1	1	1	1	0
Edit Copy Delete	7	1	1	1	1	1	1	1	1	1	0	1
Edit Copy Delete	8	1	1	1	1	2	1	1	1	1	0	1
Edit Copy Delete	9	1	1	1	1	3	1	1	1	1	0	1
Edit Copy Delete	10	1	1	1	1	1	0	1	1	1	1	1
Edit Copy Delete	11	1	1	1	1	2	0	1	1	1	1	1
Edit Copy Delete	12	1	1	1	1	3	0	1	1	1	1	1
Edit Copy Delete	13	1	1	1	1	1	1	1	1	0	1	1
Edit Copy Delete	14	1	1	1	1	2	1	1	1	0	1	1
Edit Copy Delete	15	1	1	1	1	3	1	1	1	0	1	1
Edit Copy Delete	16	1	1	1	1	1	1	1	0	1	1	1
Edit Copy Delete	17	1	1	1	1	2	1	1	0	1	1	1
Edit Copy Delete	18	1	1	1	1	3	1	1	0	1	1	1
Edit Copy Delete	19	1	1	1	1	1	1	0	1	1	1	1
Edit Copy Delete	20	1	1	1	1	2	1	0	1	1	1	1

Figure 4.21: Table for Rule

Description: In Figure 4.21 shows the database table that the possibility of rules that user is more likely to spending in the subject that was selected during the financial assessment. The value 0 means "no" and 1 means yes. For the types of vehicle 0, 1, 2 and 3 means no, car, motor, and public transport simultaneously. There is currently have 337 rules in this table.

127.0.0.1 » cb11091 » solution

Browse | Structure | SQL | Search | Insert | Export | Import | Operations | Tracking

	id	Sptptn	Sparent	Shouse	S4	Svehicle	Scredit	Sphone	Sinternet	Sastro	Szakat	Sinsurance
Edit Copy Delete	1	0.05	0.1	0.15	0	0.15	0.1	0.025	0.025	0.025	0.025	0.05
Edit Copy Delete	2	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0.025	0.05
Edit Copy Delete	3	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0.025	0.05
Edit Copy Delete	4	0.05	0.1	0.15	0	0.15	0.1	0.025	0.025	0.025	0.025	0
Edit Copy Delete	5	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0.025	0
Edit Copy Delete	6	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0.025	0
Edit Copy Delete	7	0.05	0.1	0.15	0	0.15	0.1	0.025	0.025	0.025	0	0.05
Edit Copy Delete	8	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0	0.05
Edit Copy Delete	9	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0.025	0	0.05
Edit Copy Delete	10	0.05	0.1	0.15	0	0.15	0	0.025	0.025	0.025	0.025	0.05
Edit Copy Delete	11	0.05	0.1	0.15	0	0.1	0	0.025	0.025	0.025	0.025	0.05
Edit Copy Delete	12	0.05	0.1	0.15	0	0.1	0	0.025	0.025	0.025	0.025	0.05
Edit Copy Delete	13	0.05	0.1	0.15	0	0.15	0.1	0.025	0.025	0	0.025	0.05
Edit Copy Delete	14	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0	0.025	0.05
Edit Copy Delete	15	0.05	0.1	0.15	0	0.1	0.1	0.025	0.025	0	0.025	0.05
Edit Copy Delete	16	0.05	0.1	0.15	0	0.15	0.1	0.025	0	0.025	0.025	0.05
Edit Copy Delete	17	0.05	0.1	0.15	0	0.1	0.1	0.025	0	0.025	0.025	0.05
Edit Copy Delete	18	0.05	0.1	0.15	0	0.1	0.1	0.025	0	0.025	0.025	0.05
Edit Copy Delete	19	0.05	0.1	0.15	0	0.15	0.1	0	0.025	0.025	0.025	0.05
Edit Copy Delete	20	0.05	0.1	0.15	0	0.1	0.1	0	0.025	0.025	0.025	0.05

Figure 4.22: Table for Solution

Description: Figure 4.22 shows the database table that the possibility of solutions for the financial assessment which is a hundred percent based on the rules follow by id. For example, solution for solution_id equal to 13 will match the rule_id equal to 13. There is currently 337 solutions for this table.

```
<?php
$conn = mysql_connect("localhost","root",null);

if (!$conn) {
    die("Cannot connect to database.");
}

mysql_select_db("cb11091", $conn) or die ("Could not open product database");

date_default_timezone_set('Asia/Kuala_Lumpur');
?>
```

Figure 4.23: SQL query for database connection

Description: Figure 4.23 shows the php coding that is connected to the database of cb11091. This source code is compulsory to be included in the page in order to connect to database.

RESULT AND DISCUSSION

5.1 Introduction

This chapter describes more about the outcome and result of the Personal Financial Planning application which is gathered from the development process. The purpose of this chapter is to evaluate and study the outcome of different test cases. Furthermore, this chapter also describes the testing process with the expected outcome and the actual outcome with the comment. It also describes the project constraints during the implementation process of Personal Financial Planning Application. Some suggestions are also included to improve this application.

5.2 Result and Analysis

This section describes about the disintegration and expected outcome of the development system by evaluating and appraising of the project objectives. The Personal Financial Planning Application has been implemented based on three objectives and it has fulfill all the objectives for this project which are:

i. To develop a Personal Financial Planning Prototype application.
ii. To carry out and implement rule based expert system in application.
iii. To bring forth a proposed answer for personal financial planning.

5.2.1 Objective Achievement

Objectives achievement of this Personal Financial Planning System is briefly identified in this subdivision.

i. To develop a Personal Financial Planning Prototype application.

The aim is to build the system for personal financial planning application. This application was built by using web-based programming language such as HTML, CSS, PHP and JavaScript. Furthermore, this application will not do without an internet access. Figure 5.1 shows the prototype of Personal Financial Planning Application.

Figure 5.1: Prototype of Personal Financial Planning Application

ii. To execute and implement rule based expert system in application

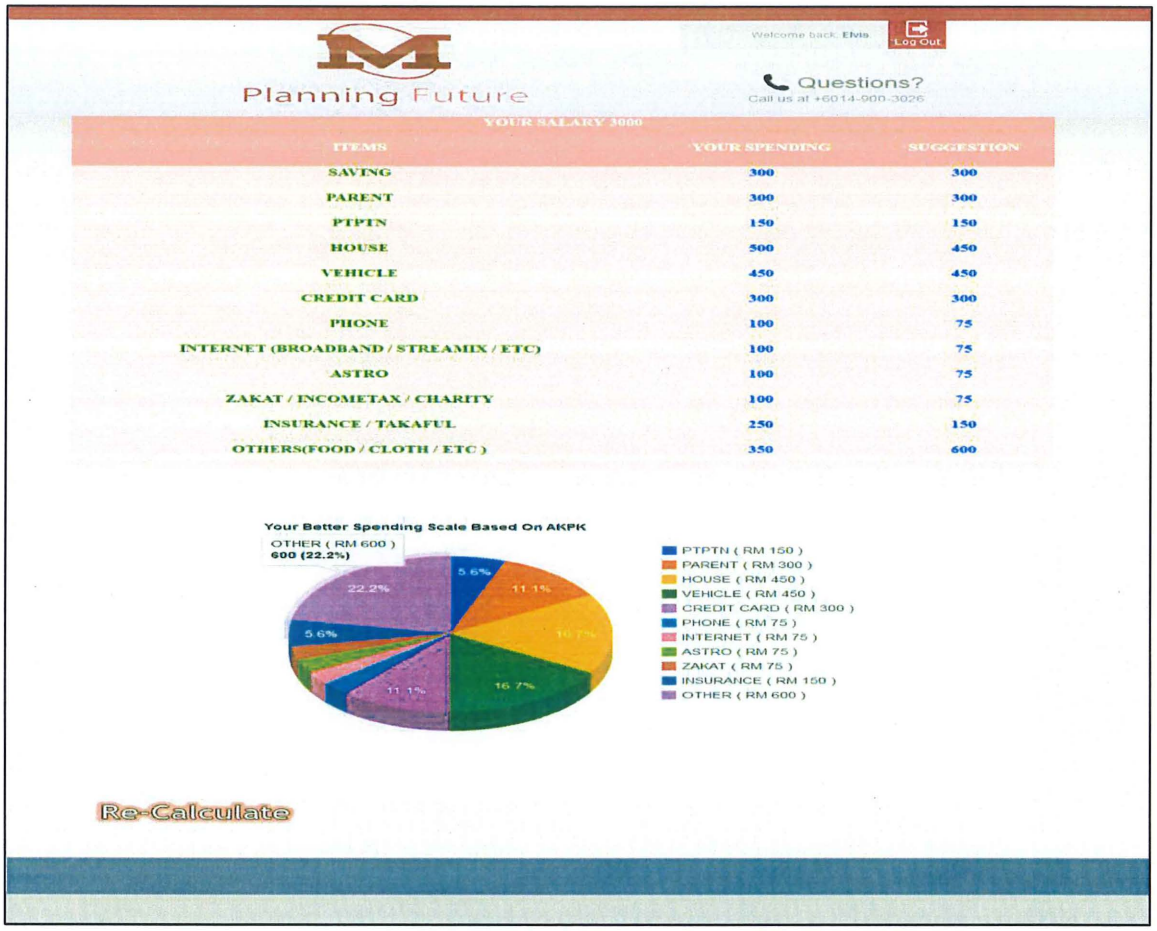
The second objective was successfully achieved, which is using rule based expert system. Forward chaining IF-ELSE statement is applied to adjust the condition to generate a result. Image 5.2 shows the set of conditions that was utilized in the system.

```
if ($ptptn == 0){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='green'>OKAY</font> IF you don't have Education Loan / PTPTN</b>"."</br></br>";
} elseif ($ptptn >= $query['Sptptn']*$Salary && $ptptn < $query['Sptptn']*$Salary*1.1){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='green'>OKAY</font></b>"."</br></br>";
} elseif ($ptptn >= $query['Sptptn']*$Salary*1.1 && $ptptn < $query['Sptptn']*$Salary*1.3){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='red'>HIGH</font></b>"."</br></br>";
} elseif ($ptptn >= $query['Sptptn']*$Salary*1.3){
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='red'>TOO HIGH</font></b>"."</br></br>";
} elseif ($ptptn >= 1 && $ptptn < $query['Sptptn']*$Salary) {
    echo "<b>Your spending in PTPTN ( RM".$ptptn." ) is <font color='red'>NOT ENOUGH</font></b>"."</br></br>";
}

if ($parent == 0){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>TOO STINGY</font></b>"."</br></br>";
} elseif ($parent >= 0 && $parent <= $query['Sparent']*$Salary*0.5){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>TOO STINGY</font></b>"."</br></br>";
} elseif ($parent > $query['Sparent']*$Salary*0.5 && $parent < $query['Sparent']*$Salary){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>STINGY</font></b>"."</br></br>";
} elseif ($parent >= $query['Sparent']*$Salary && $parent < $query['Sparent']*$Salary*1.5){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='green'>ACCEPTABLE</font></b>"."</br></br>";
} elseif ($parent >= $query['Sparent']*$Salary*1.5 && $parent < $query['Sparent']*$Salary*2.0){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>HIGH</font></b>"."</br></br>";
} elseif ($parent >= $query['Sparent']*$Salary*2.0){
    echo "<b>Your contribution for PARENT ( RM".$parent." ) is <font color='red'>TOO HIGH</font></b>"."</br></br>";
}


if ($house == 0){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='green'>GOOD</font></b>"."</br></br>";
} elseif ($house >= 0 && $house < $query['Shouse']*$Salary){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='green'>GOOD</font></b>"."</br></br>";
} elseif ($house >= $query['Shouse']*$Salary && $house < $query['Shouse']*$Salary*1.1){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='green'>OKAY</font></b>"."</br></br>";
} elseif ($house >= $query['Shouse']*$Salary*1.1 && $house < $query['Shouse']*$Salary*1.3){
    echo "<b>Your spending in HOUSE ( RM".$house." ) is <font color='red'>HIGH</font></b>"."</br></br>";
} elseif ($house >= $query['Shouse']*$Salary*1.3){
```

Figure 5.2: Implementation of rule based expert system

iii. *To generate a suggestion solution for personal financial planning*

The last target was successfully accomplished by carrying out a trace in a table and pie chart. User can consider their suggestion personal financial planning with a well-defined and obvious data. Figure 5.3 shows the suggestion for personal financial planning.



ITEMS	YOUR SPENDING	SUGGESTION
SAVING	300	300
PARENT	300	300
PTPTN	150	150
HOUSE	500	450
VEHICLE	450	450
CREDIT CARD	300	300
PHONE	100	75
INTERNET (BROADBAND / STREAMIX / ETC)	100	75
ASTRO	100	75
ZAKAT / INCOMETAX / CHARITY	100	75
INSURANCE / TAKAFUL	250	150
OTHERS(FOOD / CLOTH / ETC)	350	600

Figure 5.3: Suggestion Personal Financial Planning

5.2.2 Testing for Personal Financial Planning Application

From the result of testing, the cutoff point or minimum salary for user's should have is RM 1600. The test result is shown in the next section.

5.2.2.1 Testing Result with Salary RM 1000

Testing is developed using the test data with a salary of RM 1000. The meaning of value "0" and "1" on the table below is "no" and "yes" simultaneously.

Table 5.1: Salary RM 1000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	result
1	1	1	1	1	1	1	1	1	1	1	Not Okay
1	1	1	1	1	1	1	1	1	1	0	Not Okay
1	1	1	1	1	1	1	1	1	0	0	Not Okay
1	1	1	1	1	1	1	1	0	0	0	Not Okay
1	1	1	1	1	1	1	0	0	0	0	Not Okay
1	1	1	1	1	1	0	0	0	0	0	Okay
1	1	1	1	1	0	0	0	0	0	0	Okay
1	1	1	1	0	0	0	0	0	0	0	Okay
1	1	1	0	0	0	0	0	0	0	0	Okay
1	1	0	0	0	0	0	0	0	0	0	Okay
1	0	0	0	0	0	0	0	0	0	0	Okay
0	0	0	0	0	0	0	0	0	0	0	Okay

Table 5.2: User Key In With Salary RM 1000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
100	50	100	150	100	100	30	30	60	50	50	180	Not Okay
100	50	100	150	100	100	30	30	60	50	0	230	Not Okay
100	50	100	150	100	100	30	30	60	0	0	280	Not Okay
100	50	100	150	100	100	30	30	0	0	0	340	Not Okay
100	50	100	150	100	100	30	0	0	0	0	370	Not Okay
100	50	100	150	100	100	0	0	0	0	0	400	Okay
100	50	100	150	100	0	0	0	0	0	0	500	Okay
100	50	100	150	0	0	0	0	0	0	0	600	Okay
100	50	100	0	0	0	0	0	0	0	0	750	Okay
100	50	0	0	0	0	0	0	0	0	0	850	Okay
100	0	0	0	0	0	0	0	0	0	0	900	Okay
0	0	0	0	0	0	0	0	0	0	0	1000	Okay

Table 5.3: Suggestion with Salary RM 1000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
100	50	100	150	100	100	25	25	25	25	50	250	Not Okay
100	50	100	150	100	100	25	25	25	25	0	300	Not Okay
100	50	100	150	100	100	25	25	25	0	0	325	Not Okay
100	50	100	150	100	100	25	25	0	0	0	350	Not Okay
100	50	100	150	100	100	25	0	0	0	0	375	Not Okay
100	50	100	150	100	100	0	0	0	0	0	400	Okay
100	50	100	150	100	0	0	0	0	0	0	500	Okay
100	50	100	150	0	0	0	0	0	0	0	600	Okay
100	50	100	0	0	0	0	0	0	0	0	750	Okay
100	50	0	0	0	0	0	0	0	0	0	850	Okay
100	0	0	0	0	0	0	0	0	0	0	900	Okay
0	0	0	0	0	0	0	0	0	0	0	1000	Okay

Comment: Based on this test case with salary RM1000, suggestion from AKPK for the spending in others (food, cloth and etc.) should be more than RM 400. In conclusion monthly salary of RM 1000 is not enough for fresh grads.

5.2.2.2 Testing Result with Salary RM 1600

Testing result with a salary of RM 1600 is presented. In this test case show the cutoff level or minimum pay that the spending for others (food, textile, and so forth) is RM 400. The meaning of value 0 and 1 on the table below is no and yes simultaneously.

Table 5.4: Salary RM 1600

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	result
1	1	1	1	1	1	1	1	1	1	1	Okay
1	1	1	1	1	1	1	1	1	1	0	Okay
1	1	1	1	1	1	1	1	1	0	0	Okay
1	1	1	1	1	1	1	1	0	0	0	Okay
1	1	1	1	1	1	1	0	0	0	0	Okay
1	1	1	1	1	1	0	0	0	0	0	Okay
1	1	1	1	1	0	0	0	0	0	0	Okay
1	1	1	1	0	0	0	0	0	0	0	Okay
1	1	1	0	0	0	0	0	0	0	0	Okay
1	1	0	0	0	0	0	0	0	0	0	Okay
1	0	0	0	0	0	0	0	0	0	0	Okay
0	0	0	0	0	0	0	0	0	0	0	Okay

Table 5.5: User Key In With Salary RM 1600

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
160	80	160	240	160	160	30	30	60	50	50	420	Okay
160	80	160	240	160	160	30	30	60	50	0	470	Okay
160	80	160	240	160	160	30	30	60	0	0	520	Okay
160	80	160	240	160	160	30	30	0	0	0	580	Okay
160	80	160	240	160	160	30	0	0	0	0	610	Okay
160	80	160	240	160	160	0	0	0	0	0	640	Okay
160	80	160	240	160	0	0	0	0	0	0	800	Okay
160	80	160	240	0	0	0	0	0	0	0	960	Okay
160	80	160	0	0	0	0	0	0	0	0	1200	Okay
160	80	0	0	0	0	0	0	0	0	0	1360	Okay
160	0	0	0	0	0	0	0	0	0	0	1440	Okay
0	0	0	0	0	0	0	0	0	0	0	1600	Okay

Table 5.6: Suggestion with Salary RM 1600

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
160	80	160	240	160	160	40	40	40	40	80	400	Okay
160	80	160	240	160	160	40	40	40	40	0	480	Okay
160	80	160	240	160	160	40	40	40	0	0	520	Okay
160	80	160	240	160	160	40	40	0	0	0	560	Okay
160	80	160	240	160	160	40	0	0	0	0	600	Okay
160	80	160	240	160	160	0	0	0	0	0	640	Okay
160	80	160	240	160	0	0	0	0	0	0	800	Okay
160	80	160	240	0	0	0	0	0	0	0	960	Okay
160	80	160	0	0	0	0	0	0	0	0	1200	Okay
160	80	0	0	0	0	0	0	0	0	0	1360	Okay
160	0	0	0	0	0	0	0	0	0	0	1440	Okay
0	0	0	0	0	0	0	0	0	0	0	1600	Okay

Comment: Based on this test case with salary RM 1600, suggestion from AKPK for the spending in others (food, cloth and etc.) should be more than RM 400. In conclusion monthly salary of RM 1600 is the minimal salary for new grad.

5.2.2.3 Testing Result with Salary RM 2500

This segment indicates the outcome of testing data with a salary of RM 2500. In this test case show that salary above RM 2500 is enough for a new grad. The substance of value "0" and "1" on the table below is "no" and "yes" simultaneously.

Table 5.7: Salary RM 2500

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	result
1	1	1	1	1	1	1	1	1	1	1	Okay
1	1	1	1	1	1	1	1	1	1	0	Okay
1	1	1	1	1	1	1	1	1	0	0	Okay
1	1	1	1	1	1	1	1	0	0	0	Okay
1	1	1	1	1	1	1	0	0	0	0	Okay
1	1	1	1	1	1	0	0	0	0	0	Okay
1	1	1	1	1	0	0	0	0	0	0	Okay
1	1	1	1	0	0	0	0	0	0	0	Okay
1	1	1	0	0	0	0	0	0	0	0	Okay
1	1	0	0	0	0	0	0	0	0	0	Okay
1	0	0	0	0	0	0	0	0	0	0	Okay
0	0	0	0	0	0	0	0	0	0	0	Okay

Table 5.8: User Key In With Salary RM 2500

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
250	125	250	375	300	250	30	30	60	100	125	605	Okay
250	125	250	375	300	250	30	30	60	100	0	730	Okay
250	125	250	375	300	250	30	30	60	0	0	830	Okay
250	125	250	375	300	250	30	30	0	0	0	890	Okay
250	125	250	375	300	250	30	0	0	0	0	920	Okay
250	125	250	375	300	250	0	0	0	0	0	950	Okay
250	125	250	375	300	0	0	0	0	0	0	1200	Okay
250	125	250	375	0	0	0	0	0	0	0	1500	Okay
250	125	250	0	0	0	0	0	0	0	0	1875	Okay
250	125	0	0	0	0	0	0	0	0	0	2125	Okay
250	0	0	0	0	0	0	0	0	0	0	2250	Okay
0	0	0	0	0	0	0	0	0	0	0	2500	Okay

Table 5.9: Suggestion with Salary RM 2500

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
250	125	250	375	250	250	62.5	62.5	62.5	62.5	125	625	Okay
250	125	250	375	250	250	62.5	62.5	62.5	62.5	0	750	Okay
250	125	250	375	250	250	62.5	62.5	62.5	0	0	812.5	Okay
250	125	250	375	250	250	62.5	62.5	0	0	0	875	Okay
250	125	250	375	250	250	62.5	0	0	0	0	937.5	Okay
250	125	250	375	250	250	0	0	0	0	0	1000	Okay
250	125	250	375	250	0	0	0	0	0	0	1250	Okay
250	125	250	375	0	0	0	0	0	0	0	1500	Okay
250	125	250	0	0	0	0	0	0	0	0	1875	Okay
250	125	0	0	0	0	0	0	0	0	0	2125	Okay
250	0	0	0	0	0	0	0	0	0	0	2250	Okay
0	0	0	0	0	0	0	0	0	0	0	2500	Okay

Comment: Based on this test case, user with salary RM 2500 and above are suitable for their financial planning.

5.3 Acceptance Testing

This application has been tested to select an important test dataset to be tested in this system. The test case is showing the suggestion correctly in a systematic way.

5.4 Project Constraint Management

With the restrictions of time and knowledge constraint may influence project progress. By recognizing constraint below, so this will increase the chances to discover all limitations affecting to this project.

i. Technical Knowledge

This application is originated by using PHP language, MySQL and CSS. Acquiring internet resources and getting an important opinion from supervisor to make this Personal Financial Planning application successfully developed.

ii. Experience

Got this system with the cognition that was gathered from my previous lecturer, course, a class that was taken are Zend PHP Foundation, Web Scripting and Web Application.

5.5 Advantages and Disadvantages

5.5.1 Advantages For Personal Financial Planning Application

The advantages of Personal Financial Planning application are:

i. Personal Financial Planning application is to help fresh graduate to planning and managing their monthly income. By using this application, the system will analyse user salary and generate a suggestion of personal financial planning based on AKPK.

ii. The objective of this application is to reduce the number of bankruptcy of the young teenagers. This application is very helpful for the young teenagers where a suggestion of personal financial planning will be given based on the specific person.

5.5.2 Disadvantages For Personal Financial Planning Application

The disadvantages of Personal Financial Planning application is:

i. Not all rules have been defined for this application.
ii. In order for application to give correct suggestions the minimum salary must be RM 1600 and above. If the salary is below than RM 1600 the application will also a suggestion. However, some rules may not generate a reasonable suggestion.

5.6 Suggestion and Improvement

In this part, is study about the improvement for the functionality and also efficiency of this application. There are several suggestions and improvements can be carried out for future enhancement of Personal Financial Planning application which is state below:

i. Upgrade the system by adding new feature that is more specific to the financial planning. At these parts, developer needs to add a new rule for other solution.

ii. Implement this system using mobile application with the advance feature that can remind user for everyday spending.

iii. Add more rules and suggested solutions.

5.7 SUMMARY

At the end of this chapter, it is concluded that this project achieve all objectives. Software testing was done by an evaluation of the integrated system to determine their consistency, in term of completeness, performance and functional characteristics, to their requirements specifications.

There are a several number of test cases in this chapter; the test case with the salary of RM 1600 show in table 5.4 is the cut-off point or the minimum salary for fresh graduate. The test case with salary RM 1600 has RM 400 for others (food, cloth and etc.) if all the items in the box are filled. RM 400 is an acceptable amount for fresh graduate living in big city such as Kuala Lumpur, George Town, Ipoh, and others. The test cases with salary more than RM 1600 give a suggestion more than RM 400 for others if all of the items are filled.

There is still a lot of space to make an improvement, which upgrade the system by adding new feature that is more specific to the financial planning. At these parts, developer needs to add a new rule for other solution. And also implement this system using mobile application with the advance feature that can remind user for everyday spending.

CHAPTER 6

CONCLUSION

In Conclusion, Financial Planning Application is developed to help fresh graduate students to manage their expenses since most of the bankruptcy in Malaysia occurs among young age workers. The main reason for this bankruptcy is because they have a lot of debt on credit card. This application hopefully can reduce the number of bankruptcy in Malaysia. This application also can make a user give priority for their expenses.

This application is developed using Rapid Application Development (RAD) Software Process as a guideline to build this application. From the four phases RAD, this application was successfully developed based on the objectives that have been created. Personal Financial Planning Application is implemented by using forward chaining rule based expert system technique.

For this application, as a developer expected, this application is done successfully on time and followed the Gantt chart. Motivation and time management are very important to develop this project. Without the efficiency time management, this project will be not finished before the deadline.

At the end, this project has successfully achieved the main objectives for PSM (Projek Sarjana Muda) requirement.

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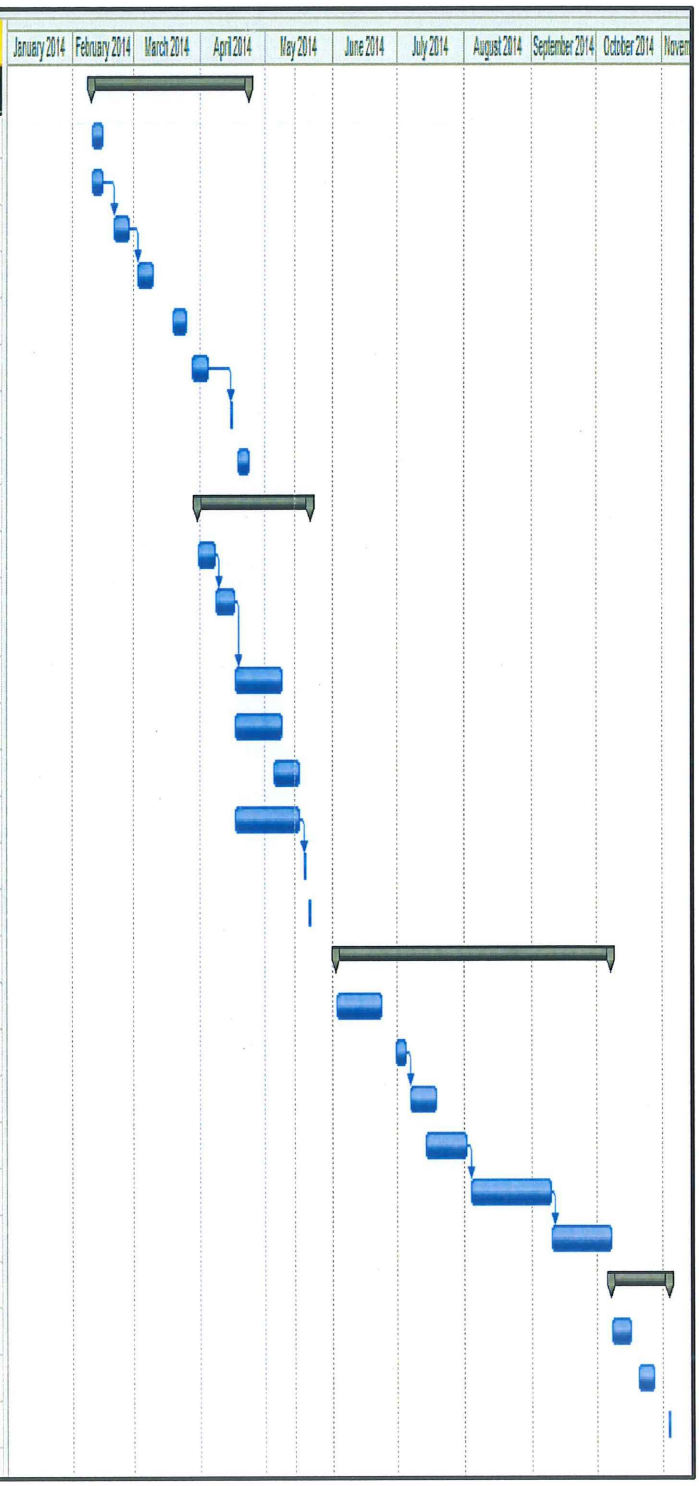
APPENDIX A

GANTT CHART FOR FINANCIAL PLANNING APPLICATION

	Task Name	Duration	Start	Finish	Predecessors
1	- Requirements Planning	53 days?	Mon 10/2/14	Wed 23/4/14	
2	Find Supervisor and Title	5 days	Mon 10/2/14	Fri 14/2/14	
3	Research Background Project	5 days	Mon 10/2/14	Fri 14/2/14	
4	Find Objective And Scope	5 days	Thu 20/2/14	Wed 26/2/14	3
5	Current News Related To Project	5 days	Mon 3/3/14	Sun 9/3/14	4
6	Research Rule Based Expert System	5 days	Wed 19/3/14	Tue 25/3/14	
7	Research On Existing System	6 days	Fri 28/3/14	Fri 4/4/14	
8	Select Software Process	1 day?	Tue 15/4/14	Tue 15/4/14	7
9	Select Computer Language	4 days	Fri 18/4/14	Wed 23/4/14	
10	- User Design	38 days?	Mon 31/3/14	Wed 21/5/14	
11	Backfround Software Process Model	6 days	Mon 31/3/14	Mon 7/4/14	
12	Rapid Application Development (RAD) Methodology	7 days	Tue 8/4/14	Wed 16/4/14	11
13	Rule Of Financial Application	16 days	Thu 17/4/14	Thu 8/5/14	12
14	Production Rule	16 days	Thu 17/4/14	Thu 8/5/14	
15	Solution Rule	10 days	Mon 5/5/14	Fri 16/5/14	
16	Draw All Diagram	22 days	Thu 17/4/14	Fri 16/5/14	
17	Draft Interface	1 day?	Mon 19/5/14	Mon 19/5/14	16
18	FSM 1 Presentation	1 day?	Wed 21/5/14	Wed 21/5/14	
19	- Contruction	91 days	Tue 3/6/14	Tue 7/10/14	
20	Full Created Interface	15 days	Tue 3/6/14	Mon 23/6/14	
21	Creat Database	5 days	Mon 30/6/14	Fri 4/7/14	
22	Login Function	10 days	Mon 7/7/14	Fri 18/7/14	21
23	Admin Function	15 days	Mon 14/7/14	Fri 1/8/14	
24	Rule Function	27 days	Mon 4/8/14	Tue 9/9/14	23
25	User Function	20 days	Wed 10/9/14	Tue 7/10/14	24
26	- Cutover	19 days?	Wed 8/10/14	Mon 3/11/14	
27	Testing Application	7 days	Wed 8/10/14	Thu 16/10/14	
28	Publish	6 days	Mon 20/10/14	Mon 27/10/14	
29	FSM 2 Presentation	1 day?	Mon 3/11/14	Mon 3/11/14	



APPENDIX B

TURN IT IN FOR CHECKING PLAGARITHM PSM 1

turnitin

Class Portfolio | Peer Review | My Grades | Discussion | Calendar

NOW VIEWING: HOME > PSM1

Welcome to your new class homepage! From the class homepage you can see all your assignments for your class, view additional assignment information, submit your work, and access feedback for your papers.

Hover on any item in the class homepage for more information.

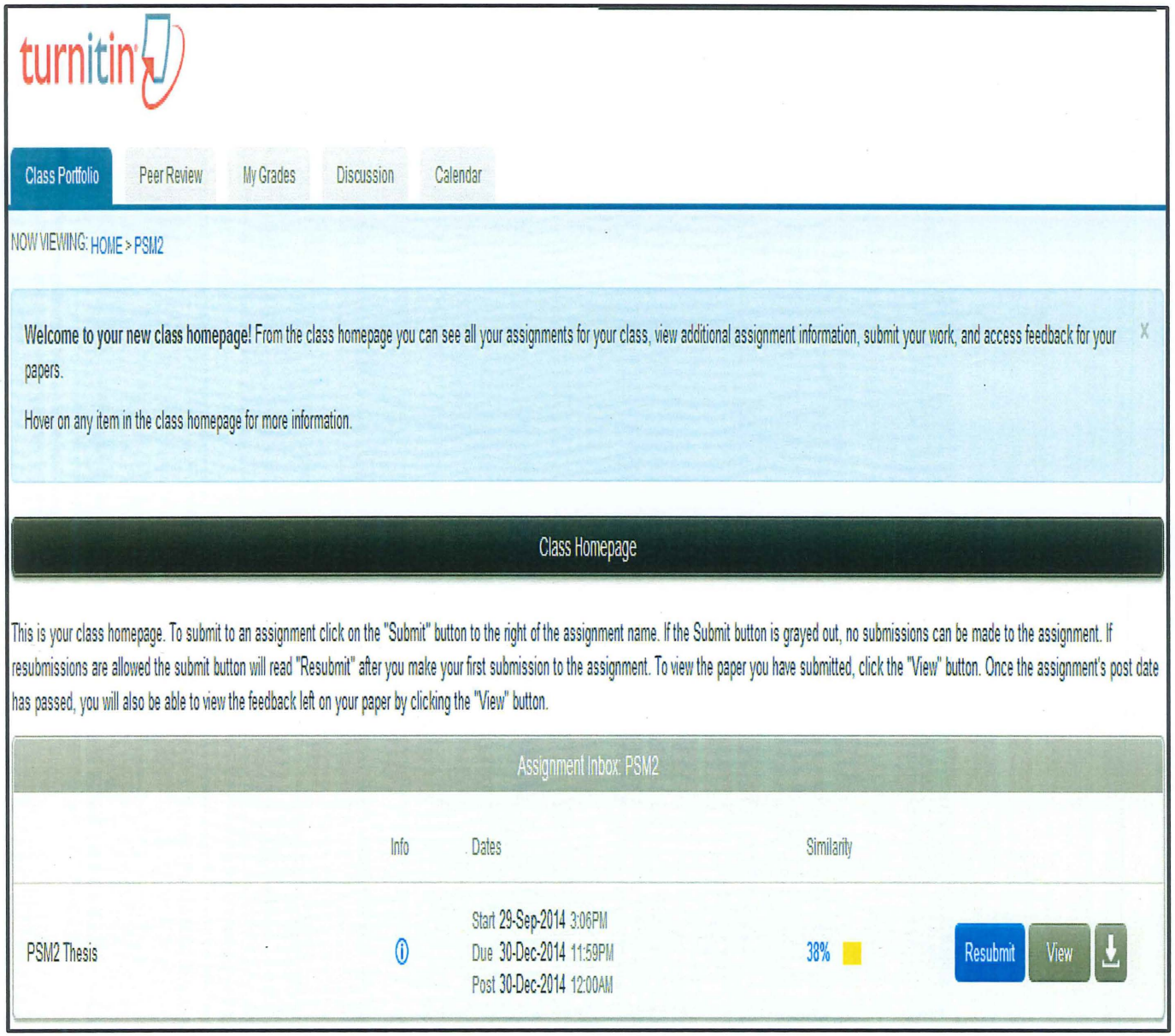
Class Homepage

This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.

Assignment Inbox: PSM1

	Info	Dates	Similarity	
PSM1 Report	ⓘ	Start 02-Dec-2013 4:09PM Due 30-Dec-2013 11:59PM Post 10-Dec-2013 12:00AM		Submit View
PSM1 Report	ⓘ	Start 03-Mar-2014 2:57PM Due 02-Jun-2014 11:59PM Post 02-Jun-2014 12:00AM	36%	Submit View

TURN IT IN FOR CHECKING PLAGARITHM PSM 2



APPENDIX C

BORANG KAUNSELING FROM AKPK

AKPK

BORANG KAUNSELING
POWER! AKPK Infoline: 1800-88-2575

Perlu diisi oleh pemohon
Dikemaskini pada 21 April 2014

Perhatian: Privasi data anda adalah penting untuk AKPK. Kami mematuhi Akta Perlindungan Data Peribadi 2010. Sila lawati laman AKPK di www.akpk.org.my untuk Notis Perlindungan Data Peribadi.

1	Tahukah anda bahawa perkhidmatan AKPK adalah percuma?	Ya	Tidak	Tidak Pasti

2	Bagaimanakah anda mengetahui tentang perkhidmatan kami?	Media		Taklimat / Pameran AKPK	
		Cetak		Bank	
		TV/ Radio		Rakan / Saudara	
		Sosial		Lain-Lain (nyatakan di bawah)	

Butir-butir Temujanji

Tarikh:				Waktu Mula		Kaunseling	Pertama kali	
				Tamat		Kaunseling	Susulan	

Butir-butir Peribadi

Nama Pemohon :							
Jantina	Lelaki		Perempuan				
Bangsa	Melayu		Cina	India		Lain-lain Bangsa	
No KP (IC No, Polis, Tentera):							
Pekerjaan							
Majikan							
Jenis Pekerjaan	Sektor Awam/ Kerajaan		Sektor Swasta/Sendiri			Pesara/ Tidak bekerja	
Taraf Perkahwinan	Bujang		Berkahwin			Ibu/Bapa Tunggal	
Jumlah Tanggungan Anak/Isteri/Ibu/Bapa							
Skala Gaji/Pendapatan	RM1,000 ke bawah						
	RM1,001 hingga RM3,000						
	RM3,001 hingga RM5,000						
	RM5,001 hingga RM10,000						
	RM10,000 ke atas						
Nombor Telefon	R/O		HP				
Alamat(Address)							
Nama Waris							
Pertalian (Relationship)	Pasangan		Anak		Saudara		
Tel No Waris (Next of Kin Tel No)							

Sila tandakan '√' yang mana berkenaan

CID		DATE			

Penyata dan Pendapatan

Nama Pemohon :

No KP(IC No, Polis, Tentera):

BUTIR-BUTIR PINJAMAN

• Pinjaman Perumahan/ASB/Sewabeli Kereta

Bank	Baki Terkini	Nilai Pasaran	Bayaran Bulanan	Catatan

• Kad Kredit

Bank	Baki Penyata Terkini termasuk Perbelanjaan yang belum dibaj	Anggaran bulanan DMP

(Sertakan helaian tambahan jika perlu)

• Pinjaman Peribadi/Mikro

Bank	Jika Pembiayaan Islam (Tanda '✓')	Jika Potongan Gaji (Tanda '✓')	Bayaran bulanan	Baki Terkini	Anggaran bulanan DMP

Peringatan: Pemohonan boleh ditolak jika anda gagal mengisytiharkan baki akaun yang sedia!

PENYATA PENDAPATAN DAN PERBELANJAAN (BULANAN) Net Disposable Income		
Pendapatan		
Gaji (selepas potongan EPF, Socso, Cukai)		
Lain-lain Pendapatan jika ada		
Jumlah Pendapatan	A	
Perbelanjaan		
Ansuran Pinjaman Rumah		
Sewa Rumah		
Ansuran Sewa Beli Kereta		
Belanja Runcit (Makanan, pakaian, kesihatan)		
Utiliti (bil air, elektrik, telefon)		
Pengangkutan		
Lain-lain Bayaran		
Jumlah Perbelanjaan	B	
Baki atau Lebihan Pendapatan (A-B)		

Kaunselor	
Tarikh Kaunseling	
No Rujukan DMP	

Bahagian ini perlu disimpan oleh pemohon setelah selesai sesi kaunseling

APPENDIX D

RULES FOR PERSONAL FINANCIAL PLANNING

Reference; 0 = No , 1 = Yes

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APPENDIX E

APLLIED RULE BASED EXPERT SYSTEM

Table Rule's Join with Table Solution's

RULE_ID 1:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 1

RULE_ID 2:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 2

RULE_ID 3:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 3

RULE_ID 4:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 4

RULE_ID 5:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 5

RULE_ID 6:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = No
AND user_other = Yes
THEN the solution_id is 6

RULE_ID 7:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 7

RULE_ID 8:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 8

RULE_ID 9:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 9

RULE_ID 10:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = No

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 10

RULE_ID 11:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = No
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 11

RULE_ID 12:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = No
AND user_zakat = Yes

AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 12

RULE_ID 13:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = No
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 13

RULE_ID 14:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes

AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = No
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 14

RULE_ID 15:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = No
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 15

RULE_ID 16:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = No
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 16

RULE_ID 17:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = No
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes

AND user_other = Yes
THEN the solution_id is 17

RULE_ID 18:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = No
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 18

RULE_ID 19:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 19

RULE_ID 20:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 20

RULE_ID 21:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 21

RULE_ID 22:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 22

RULE_ID 23:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = No
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 23

RULE_ID 24:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = No
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 24

RULE_ID 25:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 25

RULE_ID 26:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 26

RULE_ID 27:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 27

RULE_ID 28:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 28

RULE_ID 29:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 29

RULE_ID 30:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 30

RULE_ID 31:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 31

RULE_ID 32:

IF user salary RM 1600

AND user_saving = Yes

AND No= "user_parent"

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 32

RULE_ID 33:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 33

RULE_ID 34:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes

AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 34

RULE_ID 35:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = No
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 35

RULE_ID 36:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 36

RULE_ID 37:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 37

RULE_ID 38:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 38

RULE_ID 39:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = No
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 39

RULE_ID 40:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 40

RULE_ID 41:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 41

RULE_ID 42:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = No

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 42

RULE_ID 43:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = No
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 43

RULE_ID 44:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = No
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 44

RULE_ID 45:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 45

RULE_ID 46:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 46

RULE_ID 47:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 47

RULE_ID 48:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = No
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 48

RULE_ID 49:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = No
AND user_zakat = Yes
AND user_insurance = Yes

AND user_other = Yes
THEN the solution_id is 49

RULE_ID 50:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = No
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 50

RULE_ID 51:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = Yes
AND user_motor = No

AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = No
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 51

RULE_ID 52:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = No
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 52

RULE_ID 53:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 53

RULE_ID 54:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 54

RULE_ID 55:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = No
THEN the solution_id is 55

RULE_ID 56:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = No
AND user_ptptn = Yes
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 56

RULE_ID 57:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 57

RULE_ID 58:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 58

RULE_ID 59:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = No

AND user_ptptn = Yes

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 59

RULE_ID 60:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = No
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 60

RULE_ID 61:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = No
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 61

RULE_ID 62:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 62

RULE_ID 63:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 63

RULE_ID 64:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 64

RULE_ID 65:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = No
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 65

RULE_ID 66:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = No
AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 66

RULE_ID 67:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = No

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 67

RULE_ID 68:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = No

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 68

RULE_ID 69:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = No

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 69

RULE_ID 70:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = No
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 70

RULE_ID 71:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = Yes
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 71

RULE_ID 72:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 72

RULE_ID 73:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = No

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 73

RULE_ID 74

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = No

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 74

RULE_ID 75:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = No
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 75

RULE_ID 76:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = No
AND user_house = Yes
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 76

RULE_ID 77:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 77

RULE_ID 78:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 78

RULE_ID 79:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 79

RULE_ID 80:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 80

RULE_ID 81:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = No

THEN the solution_id is 81

RULE_ID 82:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 82

RULE_ID 83:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 83

RULE_ID 84:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = No

AND user_house = Yes

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 84

RULE_ID 85:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = No

AND user_other = Yes

THEN the solution_id is 85

RULE_ID 86:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 86

RULE_ID 87:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 87

RULE_ID 88:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = No

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 88

RULE_ID 89:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = No

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 89

RULE_ID 90:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = No

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 90

RULE_ID 91:

IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = No
AND user_car = No
AND user_motor = No
AND user_public = Yes
AND user_phone = Yes
AND user_internet = No
AND user_astro = Yes
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes
THEN the solution_id is 91

RULE_ID 92:
IF user salary RM 1600
AND user_saving = Yes
AND user_parent = Yes
AND user_ptptn = Yes
AND user_house = No
AND user_car = Yes
AND user_motor = No
AND user_public = No
AND user_phone = Yes
AND user_internet = Yes
AND user_astro = No
AND user_creditCard = Yes
AND user_zakat = Yes
AND user_insurance = Yes
AND user_other = Yes

THEN the solution_id is 92

RULE_ID 93:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 93

RULE_ID 94:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = No

AND user_creditCard = Yes

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 94

RULE_ID 95:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = No

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 95

RULE_ID 96:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = No

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 96

RULE_ID 97:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = No

AND user_zakat = Yes

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 97

RULE_ID 98:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = Yes

AND user_motor = No

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 98

RULE_ID 99:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = Yes

AND user_public = No

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 99

RULE_ID 100:

IF user salary RM 1600

AND user_saving = Yes

AND user_parent = Yes

AND user_ptptn = Yes

AND user_house = No

AND user_car = No

AND user_motor = No

AND user_public = Yes

AND user_phone = Yes

AND user_internet = Yes

AND user_astro = Yes

AND user_creditCard = Yes

AND user_zakat = No

AND user_insurance = Yes

AND user_other = Yes

THEN the solution_id is 100

APPENDIX F

PERSONAL FINANCIAL PLANNING SOLUTIONS

RULES	SAVING (a)	PARENT (b)	PTPTN (c)	HOUSE (d)	VEHICLE (e)			TELEPHONE (f)	INTERNET (g)	ASTRO (h)	CREDIT CARD (i)	ZAKAT (j)	TAKAFUL (k)	OTHER (l)
					CAR	MOTOR	PUBLIC							
1	-	10% x salary	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
2	-	10% x salary	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
3	-	10% x salary	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
4	-	10% x salary	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
5	-	10% x salary	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
6	-	10% x salary	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
7	-	10% x salary	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
8	-	10% x salary	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
9	-	10% x salary	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
10	10% x salary	10% x salary	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
11	10% x salary	10% x salary	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-

		salary				salary			salary	salary	salary	salary	salary	(a-b-c-d-e-f-g-h-j-j-k)]
25	-	10% x salary	50	-	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
26	-	10% x salary	-	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
27	-	10% x salary	-	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
28	-	10% x salary	-	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
29	-	-	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
30	-	-	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
31	-	-	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
32	-	-	-	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
33	-	-	-	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
34	-	-	-	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
35	-	-	50	-	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
36	-	-	50	-	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-

														j-j-k)]
37	-	-	50	-	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
38	-	-	50	20% x salary	-	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
39	-	-	50	20% x salary	25% x salary	-	-	-	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
40	-	-	50	20% x salary	-	10% x salary	-	-	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
41	-	-	50	20% x salary	-	-	15% x salary	-	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
42	-	-	50	20% x salary	25% x salary	-	-	3% x salary	-	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
43	-	-	50	20% x salary	-	10% x salary	-	3% x salary	-	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
44	-	-	50	20% x salary	-	-	15% x salary	3% x salary	-	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
45	-	-	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	-	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
46	-	-	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	-	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
47	-	-	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	-	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
48	10% x salary	-	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]

49	10% x salary	-	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
50	10% x salary	-	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
51	-	-	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
52	-	-	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
53	-	-	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
54	-	-	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
55	-	-	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
56	-	-	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
57	-	-	50	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
58	-	-	50	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
59	-	-	50	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
60	-	10% x salary	-	-	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-i-j-k)]
61	-	10% x	-	-	-	10% x	-	3% x salary	2% x	2.5% x	10% x	2.5% x	10% x	[Salary –

														j-j-k)]
74	10% x salary	10% x salary	-	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
75	10% x salary	10% x salary	-	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
76	-	10% x salary	-	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
77	-	10% x salary	-	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
78	-	10% x salary	-	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
79	-	10% x salary	-	20% x salary	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
80	-	10% x salary	-	20% x salary	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
81	-	10% x salary	-	20% x salary	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
82	-	10% x salary	50	-	-	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
83	-	10% x salary	50	-	25% x salary	-	-	-	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
84	-	10% x salary	50	-	-	10% x salary	-	-	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
85	-	10% x salary	50	-	-	-	15% x salary	-	2% x salary	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]

86	-	10% x salary	50	-	25% x salary	-	-	3% x salary	-	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
87	-	10% x salary	50	-	-	10% x salary	-	3% x salary	-	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
88	-	10% x salary	50	-	-	-	15% x salary	3% x salary	-	2.5% x salary	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
89	-	10% x salary	50	-	25% x salary	-	-	3% x salary	2% x salary	-	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
90	-	10% x salary	50	-	-	10% x salary	-	3% x salary	2% x salary	-	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
91	-	10% x salary	50	-	-	-	15% x salary	3% x salary	2% x salary	-	10% x salary	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
92	10% x salary	10% x salary	50	-	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
93	10% x salary	10% x salary	50	-	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
94	10% x salary	10% x salary	50	-	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	-	2.5% x salary	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
95	-	10% x salary	50	-	25% x salary	-	-	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
96	-	10% x salary	50	-	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
97	-	10% x salary	50	-	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	-	10% x salary	[Salary – (a-b-c-d-e-f-g-h-j-j-k)]
98	-	10% x	50	-	25% x	-	-	3% x salary	2% x	2.5% x	10% x	2.5% x	-	[Salary –

		salary			salary				salary	salary	salary	salary		(a-b-c-d-e-f-g-h-i-j-k)]
99	-	10% x salary	50	-	-	10% x salary	-	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary - (a-b-c-d-e-f-g-h-i-j-k)]
100	-	10% x salary	50	-	-	-	15% x salary	3% x salary	2% x salary	2.5% x salary	10% x salary	2.5% x salary	-	[Salary - (a-b-c-d-e-f-g-h-i-j-k)]

APPENDIX G

MORE TESTING RESULT

Salary RM 1500

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	result
1	1	1	1	1	1	1	1	1	1	1	Not Okay
1	1	1	1	1	1	1	1	1	1	0	Okay
1	1	1	1	1	1	1	1	1	0	0	Okay
1	1	1	1	1	1	1	1	0	0	0	Okay
1	1	1	1	1	1	1	0	0	0	0	Okay
1	1	1	1	1	1	0	0	0	0	0	Okay
1	1	1	1	1	0	0	0	0	0	0	Okay
1	1	1	1	0	0	0	0	0	0	0	Okay
1	1	1	0	0	0	0	0	0	0	0	Okay
1	1	0	0	0	0	0	0	0	0	0	Okay
1	0	0	0	0	0	0	0	0	0	0	Okay
0	0	0	0	0	0	0	0	0	0	0	Okay

Table: User Key In With Salary RM 1500

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
150	75	150	180	150	150	30	30	60	50	50	425	Okay
150	75	150	180	150	150	30	30	60	50	0	475	Okay
150	75	150	180	150	150	30	30	60	0	0	525	Okay
150	75	150	180	150	150	30	30	0	0	0	585	Okay
150	75	150	180	150	150	30	0	0	0	0	615	Okay
150	75	150	180	150	150	0	0	0	0	0	645	Okay
150	75	150	180	150	0	0	0	0	0	0	795	Okay
150	75	150	180	0	0	0	0	0	0	0	945	Okay
150	75	150	0	0	0	0	0	0	0	0	1125	Okay
150	75	0	0	0	0	0	0	0	0	0	1275	Okay
150	0	0	0	0	0	0	0	0	0	0	1350	Okay
0	0	0	0	0	0	0	0	0	0	0	1500	Okay

Suggestion with Salary RM 1500

savin g	ptpt n	paren t	hous e	vehicl e	credi t	phon e	interne t	astr o	zaka t	insuranc e	other s	resul t
150	75	150	225	150	150	37.5	37.5	37.5	37.5	75	375	Not Okay
150	75	150	225	150	150	37.5	37.5	37.5	37.5	0	450	Okay
150	75	150	225	150	150	37.5	37.5	37.5	0	0	487.5	Okay
150	75	150	225	150	150	37.5	37.5	0	0	0	525	Okay
150	75	150	225	150	150	37.5	0	0	0	0	562.5	Okay
150	75	150	225	150	150	0	0	0	0	0	600	Okay
150	75	150	225	150	0	0	0	0	0	0	750	Okay
150	75	150	225	0	0	0	0	0	0	0	900	Okay
150	75	150	0	0	0	0	0	0	0	0	1125	Okay
150	75	0	0	0	0	0	0	0	0	0	1275	Okay
150	0	0	0	0	0	0	0	0	0	0	1350	Okay
0	0	0	0	0	0	0	0	0	0	0	1500	Okay

Salary RM 2000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	result
1	1	1	1	1	1	1	1	1	1	1	Okay
1	1	1	1	1	1	1	1	1	1	0	Okay
1	1	1	1	1	1	1	1	1	0	0	Okay
1	1	1	1	1	1	1	1	0	0	0	Okay
1	1	1	1	1	1	1	0	0	0	0	Okay
1	1	1	1	1	1	0	0	0	0	0	Okay
1	1	1	1	1	0	0	0	0	0	0	Okay
1	1	1	1	0	0	0	0	0	0	0	Okay
1	1	1	0	0	0	0	0	0	0	0	Okay
1	1	0	0	0	0	0	0	0	0	0	Okay
1	0	0	0	0	0	0	0	0	0	0	Okay
0	0	0	0	0	0	0	0	0	0	0	Okay

User Key In With Salary RM 2000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
200	100	200	250	300	200	30	30	60	50	100	480	Okay
200	100	200	250	300	200	30	30	60	50	0	580	Okay
200	100	200	250	300	200	30	30	60	0	0	630	Okay
200	100	200	250	300	200	30	30	0	0	0	690	Okay
200	100	200	250	300	200	30	0	0	0	0	720	Okay
200	100	200	250	300	200	0	0	0	0	0	750	Okay
200	100	200	250	300	0	0	0	0	0	0	950	Okay
200	100	200	250	0	0	0	0	0	0	0	1250	Okay
200	100	200	0	0	0	0	0	0	0	0	1500	Okay
200	100	0	0	0	0	0	0	0	0	0	1700	Okay
200	0	0	0	0	0	0	0	0	0	0	1800	Okay
0	0	0	0	0	0	0	0	0	0	0	2000	Okay

Suggestion with Salary RM 2000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
200	100	200	300	200	200	50	50	50	50	100	500	Okay
200	100	200	300	200	200	50	50	50	50	0	600	Okay
200	100	200	300	200	200	50	50	50	0	0	650	Okay
200	100	200	300	200	200	50	50	0	0	0	700	Okay
200	100	200	300	200	200	50	0	0	0	0	750	Okay
200	100	200	300	200	200	0	0	0	0	0	800	Okay
200	100	200	300	200	0	0	0	0	0	0	1000	Okay
200	100	200	300	0	0	0	0	0	0	0	1200	Okay
200	100	200	0	0	0	0	0	0	0	0	1500	Okay
200	100	0	0	0	0	0	0	0	0	0	1700	Okay
200	0	0	0	0	0	0	0	0	0	0	1800	Okay
0	0	0	0	0	0	0	0	0	0	0	2000	Okay

Salary RM 3000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	result
1	1	1	1	1	1	1	1	1	1	1	Okay
1	1	1	1	1	1	1	1	1	1	0	Okay
1	1	1	1	1	1	1	1	1	0	0	Okay
1	1	1	1	1	1	1	1	0	0	0	Okay
1	1	1	1	1	1	1	0	0	0	0	Okay
1	1	1	1	1	1	0	0	0	0	0	Okay
1	1	1	1	1	0	0	0	0	0	0	Okay
1	1	1	1	0	0	0	0	0	0	0	Okay
1	1	1	0	0	0	0	0	0	0	0	Okay
1	1	0	0	0	0	0	0	0	0	0	Okay
1	0	0	0	0	0	0	0	0	0	0	Okay
0	0	0	0	0	0	0	0	0	0	0	Okay

User Key In With Salary RM 3000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
300	150	300	450	300	300	30	30	60	100	150	830	Okay
300	150	300	450	300	300	30	30	60	100	0	980	Okay
300	150	300	450	300	300	30	30	60	0	0	1080	Okay
300	150	300	450	300	300	30	30	0	0	0	1140	Okay
300	150	300	450	300	300	30	0	0	0	0	1170	Okay
300	150	300	450	300	300	0	0	0	0	0	1200	Okay
300	150	300	450	300	0	0	0	0	0	0	1500	Okay
300	150	300	450	0	0	0	0	0	0	0	1800	Okay
300	150	300	0	0	0	0	0	0	0	0	2250	Okay
300	150	0	0	0	0	0	0	0	0	0	2550	Okay
300	0	0	0	0	0	0	0	0	0	0	2700	Okay
0	0	0	0	0	0	0	0	0	0	0	3000	Okay

Suggestion with Salary RM 3000

saving	ptptn	parent	house	vehicle	credit	phone	internet	astro	zakat	insurance	others	result
300	150	300	450	300	300	75	75	75	75	150	750	Okay
300	150	300	450	300	300	75	75	75	75	0	900	Okay
300	150	300	450	300	300	75	75	75	0	0	975	Okay
300	150	300	450	300	300	75	75	0	0	0	1050	Okay
300	150	300	450	300	300	75	0	0	0	0	1125	Okay
300	150	300	450	300	300	0	0	0	0	0	1200	Okay
300	150	300	450	300	0	0	0	0	0	0	1500	Okay
300	150	300	450	0	0	0	0	0	0	0	1800	Okay
300	150	300	0	0	0	0	0	0	0	0	2250	Okay
300	150	0	0	0	0	0	0	0	0	0	2550	Okay
300	0	0	0	0	0	0	0	0	0	0	2700	Okay
0	0	0	0	0	0	0	0	0	0	0	3000	Okay