DECISION SUPPORT SYSTEM FOR INHERITANCE DISTRIBUTION ACCORDING TO ISLAMIC LAW USING THE FORWARD CHAINING METHOD

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ABSTRACT

The rapid development of information technology in all aspects of the field in this digital era is very important, such as in the fields of business economics, agriculture, culture and religion. In the religious field, technological advances will make it easier for people to learn and seek information in the religious field, as is the case in the issue of inheritance distribution which so far not all people understand it, and also the limited number of experts in the field of inheritance. Religious science is expected to provide a way to learn about inheritance easily, and with this expert system the community will be facilitated in terms of inheritance distribution problems using the forward chaining method, the system will be tested with a 100% accuracy level value in 10 tests with variables different heirs, from the test results, it is found that the system can be used properly.

Keywords: Inheritance, Forward Chaining, Backward Android

1. INTRODUCTION

Religious knowledge is a mandatory science for everyone who is religious, but in practice not all people understand it, on certain problems people tend to be foreign to study, such as the problem of inheritance distribution which is still very rarely understood by the public, because of the limitations of experts who are one of them. So the problem is, from these problems, an information technology expert system is needed to be accessed and studied by anyone who needs it, using an expert system using the Android-based forward chaining method, which is expected to be one of the solutions in determining the distribution of inheritance that can be distributed. accessed by anyone and anywhere.

1.1 Issue

The steps are experts in terms of inheritance
- Difficulty in calculating inheritance
- There is no support system that makes it easier for people to learn inheritance

1.2 Research purpose

- The goal is to create a distribution system "Expert System Supporting Decisions on Inheritance Distribution According to Islamic Law Using the Forward Chaining Method".

1.3 Scope of Problem

Based on the formulation of the problem above, the problems that will be discussed will be limited in scope as follows:

1. In planning this expert system the author will use the Android Flutter programming language, namely Dart language with Firestore database.

2. This expert system will only process inheritance that has been nominalized in rupiah currency.

3. This system only processes input from people who are the heirs of Ashhabul Furud and Ashabah. Ashhabul Furud is the part that has been determined in the Qur'an, and Ashabah is the remaining part of the division of Ashhabul Furud.

4. The output to be produced is in the form of share value per person, the amount of money obtained for each entitled heir.

5. The method used in solving this problem is the Forward Chaining method.

2. REFERENCE

2.1 The Meaning Of Inheritance In Islam

Inheritance science is one of the most important sciences for the Muslim community, while the meaning of inheritance science is the property left by a person who has died and then the property will be distributed to his heirs, in Islamic science inheritance science is usually in call it faroid, which is the science studied is about the rights of the heirs along with the calculation in accordance with the provisions of Islam, the purpose of the science of this wris is one of them so that we are more clear in determining the rights of heirs, and can also be share fairly in accordance with the provisions of Islam, with the calculation of heirs in accordance with the rights of the heirs in order to avoid disputes among siblings. As for whoever is entitled to inherit is the mother, grandmother from mother to the top, niece, granddaughter to the bottom, aunt, grandfather to the top, father, other son, grandson to the bottom etc.

2.2 Sistem Pakar

An expert system (Expert System) is designed to be able to solve quite complex problems that can only be solved by experts. Making an expert system is not to replace the expert himself but can be used as a very experienced assistant (Sri Kusumadewi, 2003). One of the features that an expert system must have is the ability to reason. If the skills are already stored as a knowledge base and there is a program that is able to access the database, the computer must be programmed to make inferences. This inference process is packaged in the form of an inference motor (inference engine).

2.3 Metode Fordward Chaining

Forward chaining is a search technique that starts with known facts, then matches these facts with the IF part of the IF-THEN rules. If there are facts that match the IF part, then the rule is executed. When a rule is executed, a new fact is added to the database. Each time the match starts from the top rule and each rule can only be executed once. The matching process stops when no more rules can be executed.

Example: Determine the color of the animal named Tweety. Initial data is Tweety flying and singing. Suppose there are 4 rules:

- If x jumps and eats insects, then x is a frog.
- If x flies and sings, then x is a canary.
- If x is a frog, then x is green.
- If x is a canary, then x is yellow.

The first thing to look for is rule number 2, because the antecedent matches our data (if Tweety flies and sings) then Consequence (then Tweety is a canary) is added to the data whave, If tweety is a canary, then Tweety is yellow (destination).).

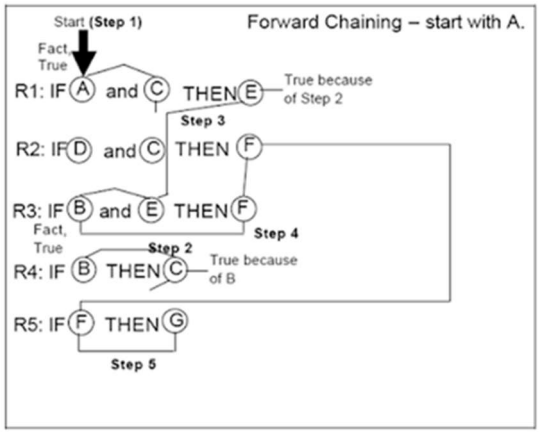

Figure 2.1 algoritm *Forward Chaining* start from A

2.3 Android

Android according to Nazaruddin (2012) is an operating system for mobile phones based on Linux. Android provides an open platform for developers to create their own applications for use by various mobile devices. Android is commonly used in smartphones and tablet PCs. Its function is the same as the Symbian operating system on Nokia, iOS on Apple and BlackBerry OS.

At Google, a team led by Rubin is in charge of developing a mobile device program powered by the Linux kernel. This is an indication that Google is preparing to face competition in the mobile phone market. The latest android version is version 4.0. (Ice Cream Sandwich). Android has also joined several smart mobiles such as LG, Samsung, Sony Ericsson, etc

3. RESEARCH METHOD

3.1 System Overview

Figure 3.1 system overview

The explanation of Figure 3.1 is that it starts from someone's confusion over determining the distribution of inheritance, and the many obstacles in getting a solution to the division and the availability of heir experts so that researchers create an Android-based expert system using information technology methods, namely using forward chaining technology, in the inheritance distribution there are some heirs who are entitled to inherit from someone who has died, as for them, are mother, grandmother from mother to above, daughters and sisters, grandchildren from women to the bottom, aunts, grandfathers to the top, fathers, sons, grandchildren men to the bottom etc. for the distribution system, it has been determined based on the provisions of the Islamic religion, with this android-based expert system, it will make it easier for users both in terms of calculations and also anyone who is entitled to receive inheritance, this can minimize disputes between brothers and sisters faster because they do not takes a long time to solve the problem, simply by accessing the application on Android, the problem has been resolved in accordance with Islamic law.

3.2 Flowchart System

The following is a flowchart that will explain the stages of determining the number of heirs based on the following:

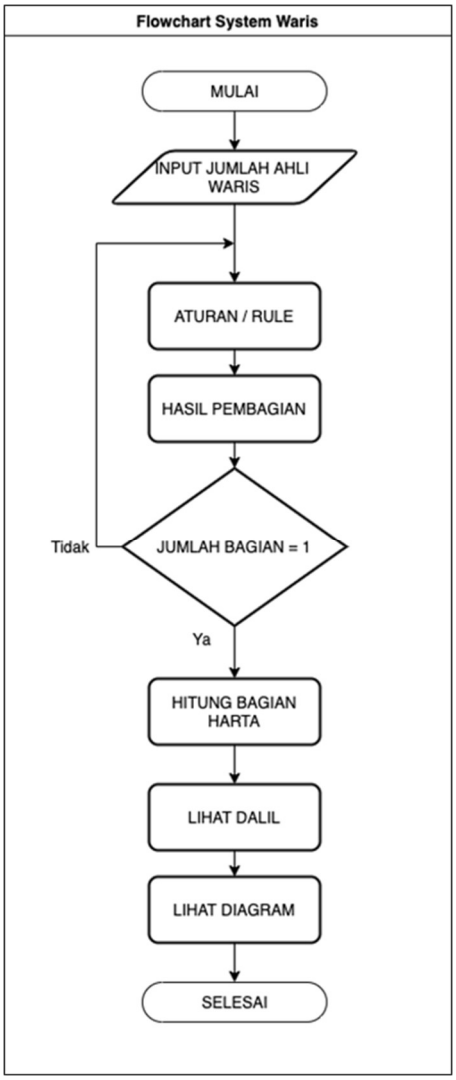

Figure 3.2 *Flowchart* expert system of legacy

The facts in the form of the number of heirs entered will be arranged based on the rules that exist in the system. After these facts are regulated by existing rules, a conclusion will be drawn in the form of a share of each heir.

After the conclusion in the form of the share of each heir is known, then this data will be used as facts for the next process. These data will be used for the process of calculating the property share. The search for arguments and the process of diagram appearance.

3.3 perhitungan metode forward chaining

The following rules are determined for the section of 25 heirs based on Islamic inheritance.

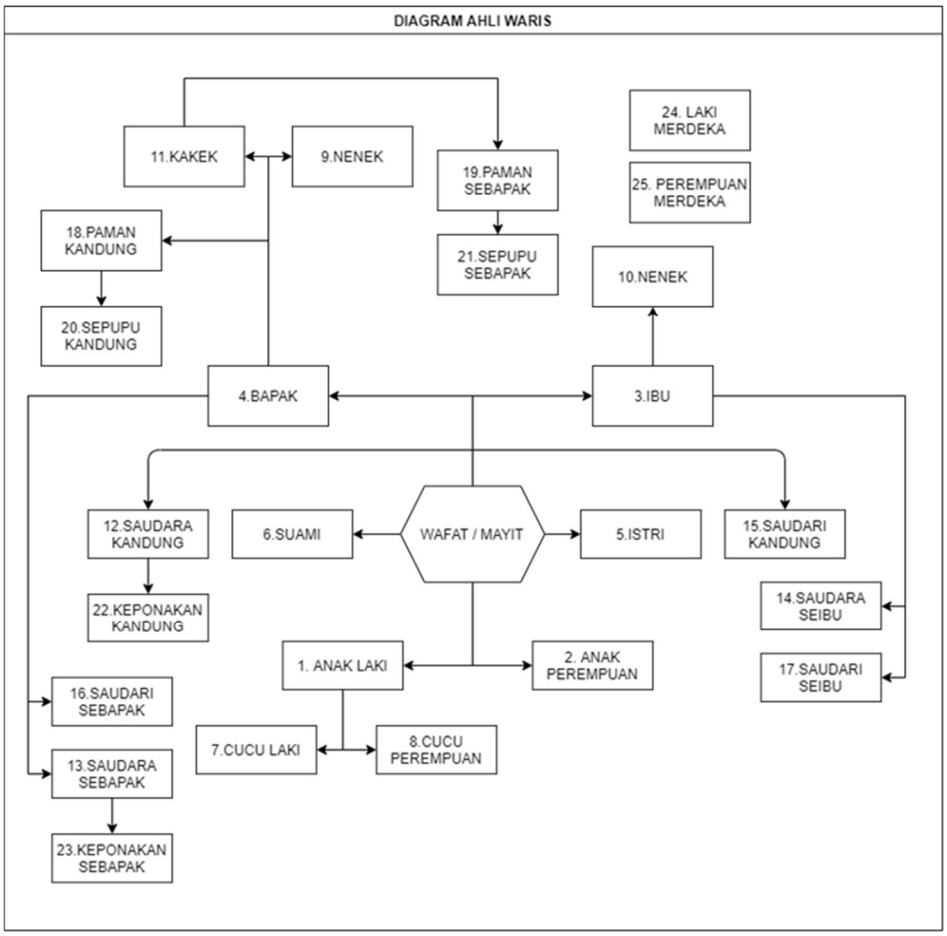

Figure 3.3 legacy

3.4 Implementation system

In this android-based expert system, it will not only calculate the part of the heirs but also information about the rights of the heirs along with the arguments.

Figure 3.3 aplication off system ecpery legacy

In Figure 3.3 it can be explained that the first step is to determine the heirs, for example the person who dies is a father and a husband, then the heirs are the wife, son, daughter, father of the deceased and mother who died. After determining the heirs, the distribution will be found according to calculations using the forward chaining method based on Islamic law that has been determined. In this expert system, it is possible to calculate the amount of money that will be inherited so that the results will be obtained correctly according to the forward chaining method.

4. RESULT AND DISCUSSION

System testing is done by the Black Box Testing method, the technique used is Validity Testing. In general, this test is carried out to provide information about whether or not the calculations in the system are correct. Validity comes from the word validity which means the extent to which the accuracy and precision of a measuring instrument in carrying out its size function (Azwar 1986). In addition, validity is a measure that indicates that the variable being measured is indeed the variable that the researcher wants to study (Cooper and Schindler, in Zulganef, 2006).

Meanwhile, according to Sugiharto and Sitinjak (2006), validity relates to a variable measuring what should be measured. Validity in research states the degree of accuracy of research measuring instruments to the actual content being measured. Validity test is a test used to show the extent to which the measuring instrument used in a measure is what is being measured.

A test can be said to have high validity if the test carries out its measuring function, or provides precise and accurate measurement results in accordance with the purpose of the test. A test that produces data that is not relevant to the purpose of the measurement is said to be a test that has low validity.

The other side of the notion of validity is the aspect of measurement accuracy. A valid measuring instrument can carry out its measuring function correctly, it also has high accuracy. The meaning of accuracy here is to be able to detect small differences in the attributes it measures. of validity.

Testing of the Inheritance Mobile Application is carried out based on a comparison of the data resulting from manual calculations and system calculations which will automatically apply the rules according to the Heirs section. The calculation formula is made according to the Compilation of Islamic Law CHAPTER 2 to chapter 4, concerning Inheritance, QS An-Nisa '4:11-12, and the online reference from Yazid Muttaqin, 2018. Procedures for the Distribution of Inheritance in Islam.

1	ahli waris	bagian	AM	(Harga/Total AM*AM)
				IDR0
	istri	1/8		IDR10.000.000
	anak per	Ashabah		IDR23.333.333
	Anak laki	Ashabah		IDR46.666.667
		jumlah	8	

		Total
Ashaba	IDR70.000.000	IDR80.000.000
Harta	IDR80.000.000	
Harga/total AM	10000000	
BAGIAN	23333333,33	

Figure 4.1 example 1, 1 wife, 1 daughter, 1 son. Manually

Figure 4.2 example 1, 1 wife, 1 daughter, 1 son.

2	ahli waris	bagian	AM	(Harga/TotalAM*AM)
				IDR0
	istri	1/4	3	IDR75.000.000
	anak per	1/6	2	IDR50.000.00
	Anak laki	Ashabah	7	IDR175.000.000
		jumlah	12	
				Total
	kpk	12		IDR300.000.000
	Harta	IDR300.000.000		
	Harga/total AM	IDR25.000.000		

Figure 4.3 example 2, 1 husband, 1 mother, 1 son. MAnually.

Figure 4.4 example 2, 1 husband, 1 mother, 1 son. Manually.

4.5 Comparison of suitability of results

In the following table, a comparison of the assessments manually and with the program system will be carried out to validate the level of accuracy of the results of the rules applied to the program. The following is a comparison table of program results and manual rule calculations that have been tried before.

Table 4.5 blax box result

Tes 1	Harta Waris	Rp80.000.000				∑Match
	Ahli Waris	istri	anak per	anak laki		
	manual	Rp10.000.000	Rp23.333.333	Rp46.666.667		Yes
	program	Rp10.000.000	Rp23.000.000	Rp46.666.667		
Tes 2	Harta Waris	Rp300.000.000				∑Match
	Ahli Waris	Suami	Ibu	anak laki		
	manual	Rp75.000.000	Rp50.000.000	###########		Yes
	program	Rp75.000.000	Rp50.000.000	###########		
Tes 3	Harta Waris	Rp300.000.000				∑Match
	Ahli Waris	istri	ibu	anak laki	anak per	
	manual	Rp37.500.000	Rp50.000.000	###########	Rp70.833.333	Yes
	program	Rp37.500.000	Rp50.000.000	###########	Rp70.833.333	

Tes 4	Harta Waris	Rp300.000.000				∑Match
	Ahli Waris	bapak	ibu	anak per	cucu laki	
	manual	Rp50.000.000	Rp50.000.000	###########	Rp50.000.000	Yes
	program	Rp50.000.000	Rp50.000.000	###########	Rp50.000.000	
Tes 5	Harta Waris	Rp150.000.000				∑Match
	Ahli Waris	Suami	bapak	ibu	anak laki	
	manual	Rp37.500.000	Rp25.000.000	Rp25.000.000	Rp62.500.000	Yes
	program	Rp37.500.000	Rp25.000.000	Rp25.000.000	Rp62.500.000	
Tes 6	Harta Waris	Rp150.000.000				∑Match
	Ahli Waris	istri	anak per	ibu	bapak	
	manual	Rp18.750.000	Rp75.000.000	Rp25.000.000	Rp31.250.000	Yes
	program	Rp18.750.000	Rp75.000.000	Rp25.000.000	Rp31.250.000	
Tes 7	Harta Waris	Rp170.500.000				∑Match
	Ahli Waris	istri	bapak	ibu	anak laki	
	manual	Rp18.750.000	Rp75.000.000	Rp25.000.000	Rp31.250.000	Yes
	program	Rp18.750.000	Rp75.000.000	Rp25.000.000	Rp31.250.000	
Tes 8	Harta Waris	Rp200.000.000				∑Match
	Ahli Waris	istri	bapak	ibu	cucu perempuan	
	manual	Rp22.222.222	Rp29.629.630	Rp59.259.259	Rp88.888.888	Yes
	program	Rp22.222.222	Rp29.629.630	Rp59.259.259	Rp88.888.888	
Tes 9	Harta Waris	Rp100.000.000				∑Match
	Ahli Waris	istri	kakek	cucu laki		
	manual	Rp12.500.000	Rp16.666.667	Rp70.833.833		Yes
	program	Rp12.500.000	Rp16.665.667	Rp70.833.833		
Tes 10	Harta Waris	Rp50.000.000				∑Match
	Ahli Waris	istri	ibu	anak per		
	manual	Rp7.894.737	Rp10.526.316	Rp31.578.947		Yes
	program	Rp7.894.737	Rp10.526.316	Rp31.578.947		

Based on the results of the blackbox table above, the accuracy value is determined to determine whether the program can replace the function of an Inheritance expert, the formula for calculating accuracy is,

$$\text{Accuracy} = \frac{\sum \text{Match}}{\sum tp} \text{ X } 100\% \text{ .}$$

Where Match is the number of correct classifications which can be given a value of 1 if the data is very identical and can be valued at 0.5, 0.75, 0.8 depending on how similar the data is compared between manual calculations and system calculations, and tp is the number of tests performed. And for the accuracy results are as follows

$$\text{Accuracy} = 1010 \text{ X } 100\% = 100\% \ .$$

By doing 10 experiments with different heir variables and getting the correct classification value on all test data that has been carried out, the accuracy data obtained is temporarily worth 100%. So it can be concluded that the mobile Inheritance expert application using this forward chaining method can be used to help replace an expert in dealing with the distribution of inheritance according to the Islamic religion.

5. CONCLUSION

1. In this application, it can help do expert work, namely doing inheritance calculations with an Android mobile-based application.
2. Calculations on the program system are carried out using the forward chaining method with rules that are in accordance with the arguments of the Qur'an.
3. In the validity testing, the suitability of the program results gets a 100% accuracy percentage with a lot of test data 10 times with different heir variables to determine the rule as the actual situation.

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