

# Rules-Based System for Writing Arabic Numerals in Indonesian Words

Original Scientific Papers

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**Abstract** – One of the algorithms stored in natural intelligence is the writing of Arabic numerals in Indonesian words. Algorithms in natural intelligence are not easy to find. This problem gave us an idea to create artificial intelligence that tries to mimic natural intelligence algorithms. The proposed algorithm for building artificial intelligence is an R-Z rule-based system. This rule-based system contains a knowledge base of R-Z rules and a knowledge base of facts. In the knowledge base, the R-Z rule provides the R rule and the Z rule, while the facts knowledge base provides facts in the form of a definite standard number and an affix word. R-Z rule-based system for reasoning writing Arabic numerals in Indonesian words uses forward chaining. Artificial intelligence designs that mimic natural intelligence in writing numbers in Indonesian words were made in C using Borland C++ 5.02 software. The experimental results show that by applying the R's rule of seven rules and Z's of twenty-five rules, the R-Z rule-based system can write Arabic numerals in Indonesian words from Arabic numerals "0" to Arabic numerals "9999999". For example, to write the Arabic number "10" in Indonesian words, the R-Z rule-based system starts with the R2 rule. Rule R2 takes action on Z3 to create new facts about Arabic numerals in the Indonesian word, namely "SEPULUH."

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**Keywords:** natural intelligence, artificial intelligence, rules-based system, Borland C++ 5.02

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## 1. INTRODUCTION

When humans are born into the world, the learning process in humans has started. The human brain, also known as natural intelligence, then stores all the information it gets. Apart from being in the form of sound, one of the outputs of natural intelligence is hand gestures in writing Arabic numerals in Indonesian words.

Arabic numerals without the cents after a comma [1] are Arabic numerals written in Indonesian words. We realize that natural intelligence has the potential to make mistakes in writing Arabic numerals in Indonesian words. Therefore, how to write the number of numerals, letters and the correctness of writing Arabic numerals in Indonesian word in the letter of payment need to be checked [2]. For example, single Arabic numerals, such as "1" [3] in Indonesian words, are "SATU." In compound Arabic numerals, such as "111" [3], the write-in Indonesian words are "SERATUS SEBELAS."

Rule-based systems (also known as production systems or expert systems) are a method that can use to create simple artificial intelligence [4-9]. Based on the above opinion, we were inspired to actualize artificial intelligence that could imitate natural intelligence in writing Arabic numerals without the cents after a comma in Indonesian words.

The artificial intelligence that we create is artificial intelligence-based on our ability to communicate using the C language with computers. The language we use to communicate with computers is the simple C language. The goal is for the computer to do its job the way we want it.

In this paper, C is the language we use to communicate with computers in making artificial intelligence. In addition, we have designed the C language syntax in artificial intelligence to be as simple as possible and easy to understand for ourselves and the computer.

In making artificial intelligence, the information (also known as facts) that we use is atomic facts of Arabic numerals in Indonesian words. The knowledge base of factual is a place to store all atomic Arabic numerals words in Indonesian words. Therefore, to obtain atomics data for Arabic numeric words in Indonesian words, we applied a reasoning method, namely forward chaining reasoning. As for the control, we apply rule-based methods. Furthermore, the rules we use are supervised rules (to get atomic number words in Indonesian words, we do not adjust the search technique).

We hope that this artificial intelligence can be an alternative solution to errors that may occur by natural intelligence in writing Arabic numerals without the cents after a comma in Indonesian words.

## 2. LITERATURE REVIEW

There have been many researchers who have implemented a rule-based system in making artificial intelligence. Each artificial intelligence has its specialty and depends on the problems it solves.

Application of rule-based systems for manufacturing artificial intelligence that provides good results such as prevention and early detection of breast cancer [7], diagnosis of chest pain in infants and children [8], diagnosis and appropriate advice on onion plant diseases [9], and others [4-6].

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### 2.1 RULES-BASED REPRESENTATION FRAMEWORK

Rules represent most of the knowledge in a rule-based system. That is a conditional sentence that connects one statement of fact with another [10]. In [10] also explains that the representation of factual in the database can use a convenient pattern. Patterns are like arrays, string symbols, or list structures. The rules are

IF (condition) THEN (action)

As the name implies, a rule-based system uses rules to select an action. In general, the condition part or the left side of the rules can be any pattern. This pattern is part of the matching to the database. Usually, it is also allowed to contain variables that may be bound in different ways. Then the actions section or the right side of the rule can be executed.

It is also explained by [10] that rule interpreters have the task decide which rules will be applied. It decides how to determine the condition rule that must be compatible with the database and monitors the problem-solving process. When implementing an interactive program, it can turn to the user and ask for information (facts) that allows for rule implementation.

### 2.2 RULES-BASED DEVELOPED REPRESENTATION FRAMEWORK

The rule-based system developed (we call the R-Z rule-based system) to be applied in this paper, namely writing Arabic numerals with Indonesian words the same as the rule-based system in general. The rules are:

#### First rule:

IF (condition-1) THEN (function)

The condition-1 part or the left side of the rule in the first rule must be an integer value variable. This variable is part of the matching to the appropriate integer value. Then the function section or the right side of the rule can execute

#### Second rule:

IF (condition-2) THEN (new\_fact) AND (function)

The condition-2 part or the left side of the rule in the second rule must be an integer value variable. This variable is part of the matching to the appropriate integer value. Then in the new\_facts section and the function or the right side of the rule can be executed.

#### Third rule:

IF (condition-3) THEN (new\_fact)

The condition-3 part or the left side of the rule in the third rule must be an integer value variable. This variable is part of the matching to the appropriate integer value. Then in the new\_facts section or the right side of the rules can be executed.

#### Notation Rules

Because the rule-based system applied in this paper has several rules, it is necessary to create a rule notation. This rule notation aims to facilitate the observation of the reasoning carried out by this rule-based system. The notation is:

- The first rule is denoted as rule R.
- The second and third rules are denoted as rule Z.

#### Rules Diagram

The rule diagramming in this paper aims to describe a rule-based system using rules to select an action. The diagram is:

- The first and second rules have the diagram form following:

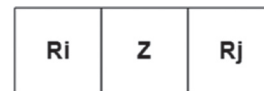


Fig. 1. The first and second rules, where  $i > j$

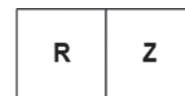


Fig. 2. The first and third rule

The rule diagram in Fig. 2 is a block diagram that produces new facts and recent facts as problem-solving.

### 2.1 BASIC STRUCTURE OF A RULE-BASED SYSTEM

#### 2.3.1 Knowledge Base

The knowledge base contains domain knowledge that is useful for problem-solving. In a rule-based system, the knowledge base represents a set of rules. Each rule can have a relation, recommendation, direction, strategy, or heuristic and has an IF (condition) THEN (action) structure, where when the condition part of the rule fulfills, the actions part will be carried out [11].

### 2.3.2 Database

The database includes a set of facts. These facts will come out whenever they match the IF (condition) part of the rules stored in the knowledge base [11].

### 2.3.3 Inference Engine

The task of the inference engine is to interpret and evaluate facts in the knowledge base to provide answers. Pada makalah ini, mesin inferensi menerapkan aturan R dan Z (dijelaskan pada bagian 2.2) dari basis pengetahuan dan mengevaluasi untuk mendapatkan fakta baru. Proses evaluasi dilakukan berulang-ulang bilamana penafsiran menemukan aturan R. The evaluation ends when you get rule Z as the answer. In applying the R and Z rules, the inference engine works by forward chaining.

### 2.3.4 User Interface

The user interface is a place to communicate between users with artificial intelligence. The user interface is made up as simple as possible and user-friendly. The available user interfaces are as follows:

- A place to enter Arabic numerals without decimal places.
- Information. Want to try again? Option [YES / NO.]

## 2.2 ARABIC NUMERALS

Arabic numerals are symbols that represent quantity. The number of digits in the international standard is an Arabic number in multiples of ten. Often the number system is also referred to as Arabic numerals because it takes numerals from the Arabic numeral system and symbols [12-16].

Arabic numerals consist of ten basic symbols as follows [17-19]:

0, 1, 2, 3, 4, 5, 6, 7, 8 and 9

The single Arabic numeral symbol is also called a number. A combination of two or more of the ten basic Arabic numerals is called compound Arabic numerals.

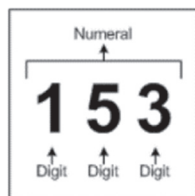


Fig. 3. Arabic numerals 153

## 2.5 POSITION SEQUENCE OF ARABIC NUMERALS

The reading of Arabic numerals is read based on the sequence of digit positions. The read position starts from the right end and moves to the far left. In the number system, each position occupied by an Arabic number (also called a digit), either a single or a com-

ination, has a meaning. The meaning of an Arabic number in a word in Indonesian follows its location (for three positions), as follows:

- The unit is the first digit from the far right.
- Tens are the second digit from the far right.
- Hundreds are the third digit from the far right.

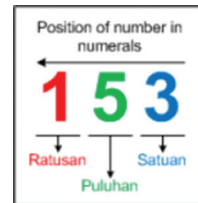


Fig. 4. The meaning of Arabic numerals positions in Indonesian words

Fig. 4 explains that "153" is a combination of the following three Arabic numerals "1", "5", and "3". Based on the position order, the single Arabic number "1" is HUNDREDS, then the single Arabic number "5" is TENS, and the last single Arabic number "3" is UNIT.

## 2.6 WRITING ARABIC NUMERALS IN INDONESIAN WORDS

In Indonesian grammar, writing Arabic numerals in Indonesian words is one of the learning topics [20-21]. Learning to write Arabic numerals in Indonesian words becomes useful when making transactions such as deposits/transfers/clearing/billing, in banks, or in receiving money.

A transaction will be accepted if the check between writing Arabic numerals and writing Arabic numerals in Indonesian words both of the same meaning is correct [2]. The following is an example of a transaction at a bank where the Arabic numeric writing and Arabic numeric writing in the Indonesian word entered in the deposit/transfer/clearing/billing form have the same meaning.

The image shows a screenshot of a bank's multi-payment form. The form is titled 'formulir multi pembayaran multi payment form'. It contains several sections:
 

- VALIDASI** (Validation)
- MAZA UANG** (Currency) with options for RUPIAH (Local Currency) and VALUTA ASING (Foreign Currency).
- JENIS SETORAN** (Deposit Type) with options for TUNAI (Cash) and WARKAT SENDIRI (Bank Mandiri's Cheque).
- DEBIT REKENING** (Debit Account)
- PENERIMA** (Beneficiary) with fields for NAMA PERUSAHAAN/PENYEDIA JASA (Company/Service Provider Name), No. PELANGGAN/NIM/NIS/No. MVA (Customer No./Student ID/NIK No.), and ALAMAT & NO. TELEPON/Address & Telephone No.
- JUMLAH** (Total) with the amount Rp. 842.760,-.
- TERBILANG** (In Words) with the amount Delapan Ratus Empat Puluh Dua Ribu Tujuh Ratus Enam Puluh Rupiah.
- PENYETOR/PEMILIK REKENING** (Depositor's Name) and NAMA/Name.
- TANDA TANGAN TELLER** (Teller's Signature) and TANDA TANGAN PENYETOR (Depositor's Signature).

Fig. 5. multi-payment form

Fig. 5 explains that the multi-payment form must write Arabic numerals symbols accompanied by Arabic numeral writing in Indonesian words.

Writing Arabic numerals without the cents after a comma in Indonesian words is a single and combined type sequentially shown in Table 1 and Table 2.

**Table 1.** Single Arabic numerals

Arabic Numerals	The number of digits	Arabic Numerals In Indonesian words
0	1	NOL
1	1	SATU
2	1	DUA
3	1	TIGA
4	1	EMPAT
5	1	LIMA
6	1	ENAM
7	1	TUJUH
8	1	DELAPAN
9	1	SEMBILAN

**Table 2.** Combined Arabic numerals

Arabic Numerals	The number of digits	Arabic Numerals In Indonesian words
10	2	SEPULUH
11	2	SEBELAS
12	2	DUA BELAS
20	2	DUA PULUH
100	3	SERATUS
191	3	SERATUS SEMBILAN PULUH SATU
210	3	DUA RATUS SEPULUH
311	3	TIGA RATUS SEBELAS
412	3	EMPAT RATUS DUA BELAS
1000	4	SERIBU SATU
2010	4	DUA RIBU SEPULUH
3011	4	TIGA RIBU SEBELAS
10000	5	SEPULUH RIBU
20010	5	DUA PULUH RIBU SEPULUH
30011	5	TIGA PULUH RIBU SEBELAS
40012	5	EMPAT PULUH RIBU DUA BELAS

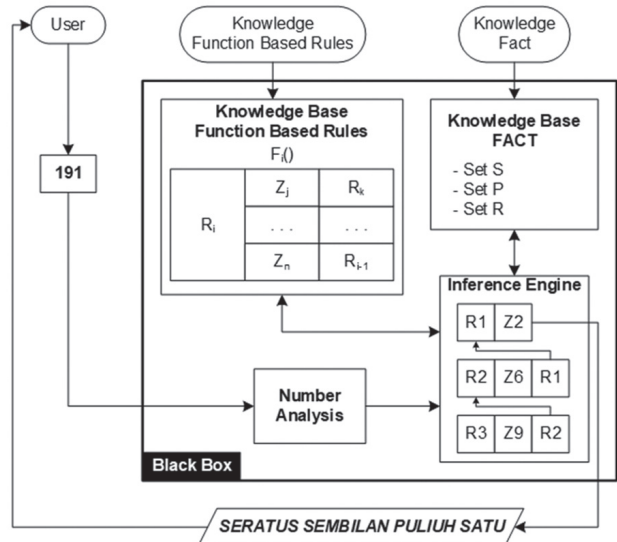
### 3. RESEARCH METHODOLOGY

#### 3.1 EXPERIMENTAL ENVIRONMENT

In this paper, the C language in Borland C++ 5.02 software is a device that we use to communicate with computers to create artificial intelligence that mimics the ability of natural intelligence to write Arabic numerals in Indonesian words. For the operating system, we use Microsoft Windows 8.1 Pro-64 bit using the following platform: Intel (R) Core (TM) i3 3217U CPU @ 1.80 GHz and Memory (RAM): 2.00 GB.

#### 3.2 RULES-BASED SYSTEM DESIGN FOR WRITING ARABIC NUMERALS IN INDONESIAN WORDS

The design of artificial intelligence applies a rule-based system for writing Arabic numerals without the cents after a comma in Indonesian words, as shown in Fig. 6.



**Fig. 6.** Design of a rule-based system for artificial intelligence to write Arabic numerals in Indonesian words

Fig. 6. explains that in designing artificial intelligence so that it can write Arabic numerals in Indonesian words using a rule-based system, it has a supporting component. The components that make up this artificial intelligence unit are as follows:

1. User interface. This component functions as a place for communication between users with artificial intelligence, such as entering Arabic numerals without the cents after a comma or leaving artificial intelligence.
2. Knowledge base rules. This component stores a set of rules for problem-solving.
3. Knowledge base of facts. This component stores a set of facts to form a new datum.
4. Inference engine. This component is to interpret and evaluate facts in the knowledge base to provide answers.
5. Add rules. This component is for adding new rules.
6. Add facts. This component is to add a new datum.

#### 3.3 Rule-Based Algorithm for Writing Arabic Numerals in Indonesian Word

The algorithm of artificial intelligence for writing Arabic numerals without the cent after a comma in Indonesian words using a rule-based system is as follows:

**Step 1:** Creating the user interface.

The user interface used for:

- 4.1 Enter the Arabic numerals of the user.
- 4.2 Interact with computers.
  - a. If the user enters non-Arabic numerals, the system notifies the error, then the system exits.
  - b. If the user enters Arabic numerals without the cents after a comma, the system performs the reasoning. If the system resolves the problem, the user interface displays Arabic numerals in Indonesian words. If the system cannot solve the problem, it gives the user the option to type "Y/ N." If the user types "N," the system exits.

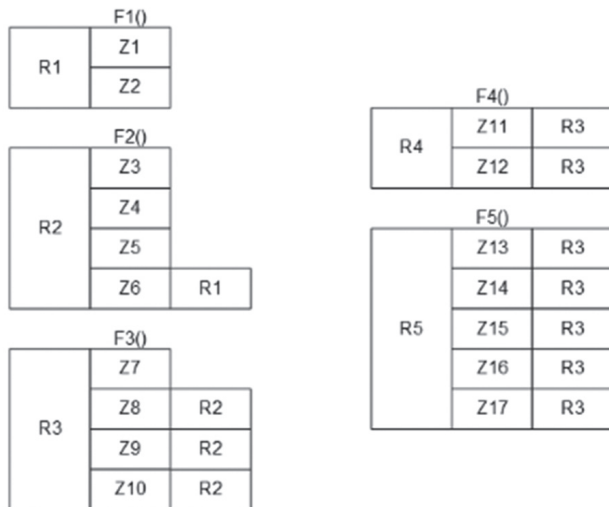
**Step 2:** Creating a database.

The database contains a collection of facts in the form of atomic Arabic numerals in Indonesian words. Examples of atomic Arabic numerals in Indonesian words are as follows:

Set S = {Nol, Satu, Dua, Tiga, Empat, Lima, Enam, Tujuh, Delapan, Sembilan}

**Step 3:** Create a knowledge base

The rules we created are the R and Z rules. The R and Z rules in the knowledge base, as shown in the diagram, are as follows:



**Fig. 7.** Function-based rules (R-Z) in the knowledge base of artificial intelligence write Arabic numerals in Indonesian words

**Step 4:** Create Output Views

This section has the task of displaying the results of the reasoning that occurs in the inference engine. The reasoning results views are the R and Z rules.

For example (see fig. 6 in the inference engine box). Writing Arabic numerals in Indonesian words in Arabic numerals 191 uses the R3 Z9 R2 Z6 R1 Z2 reasoning, and Arabic numerals without decimal places are "SERATUS SEMBILAN PULUH SATU."

**4. RESULTS**

This section will explain the result of test a rule-based algorithm for writing Arabic numerals without the cents after a comma in Indonesian words. The algorithm testing carried out using two types of test input. The two types of test input are as follows:

1. Enter not Arabic-numerals type.
2. Enter the Arabic-numerals type.

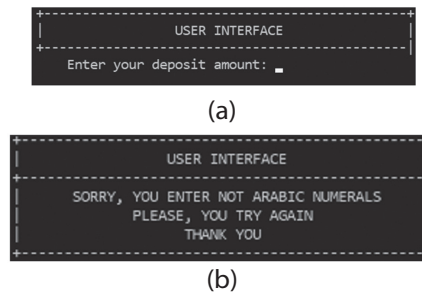
**4.1 ENTER NOT ARABIC-NUMERALS TYPE**

In addition to numerals representing the ASCII code between 48 and 57, input is not Arabic numerals. This test aims to find out that the R-Z rule-based system has worked consistently as in the design.

In this section, using two types of input, the first is the type of letter, and the second is the type of combination between numerals with comma punctuation.

**4.1.1 Test input with letters**

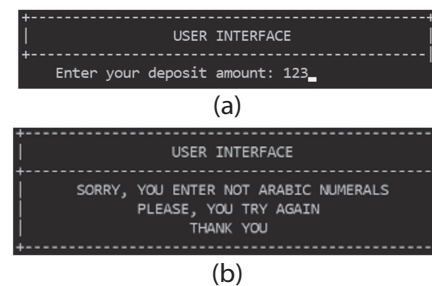
In this test, the letter "a" is the letter chosen as the input for the system. When typed the letter "a" the system responds, as shown in Fig. 8.



**Fig. 8.** (a) The letter "a" as input, (b) the response of artificial intelligence using an R-Z rule-based system

**4.1.2 Test input by combining Arabic numerals with comma punctuation.**

In this test, the combination of Arabic numerals with a comma punctuation "123," is the input for the system. When the Arabic number "123" is typed, the system does not respond. However, the system response is as shown in Fig. 9 after typing a comma.



**Fig. 9.** (a) Combined Arabic numerals with a comma punctuation "123," as input, (b) responses from artificial intelligence using an R-Z rule-based system

The test results above show that the rule-based algorithm for writing Arabic numerals without the cents after a comma in Indonesian words has worked according to the design. In other words, the system will not write Arabic numerals in Indonesian words with such input.

#### 4.2 ENTER WITH ARABIC NUMERALS WITHOUT THE CENTS AFTER A COMMA

In this section, the rule-based algorithm for writing Arabic numerals without the cents after the comma in Indonesian words will be tested with Arabic numerals without the cents after the comma in singular and combined form.

Since the draft states that new rules and facts can be added to the system, the system test by entering Arabic numerals without the cents after the comma carry out into two parts as follows:

1. Before adding new rules and facts.
2. After adding new rules and facts.

##### 4.2.1 Testing the system before adding new rules and facts

In this section, enter the Arabic numerals without the cents after the comma in the singular and combined form used to test the system, as shown in Table 3.

**Table 3.** Data Single and Combined Arabic Numerals for Testing the R-Z Rules-Based System

Arabic Numerals	The number of digits	Arabic Numerals In Indonesian words
0	1	NOL
1	1	SATU
10	2	SEPULUH
11	2	SEBELAS
12	2	DUA BELAS
120	3	SERATUS DUA PULUH
121	3	SERATUS DUA PULUH SATU
122	3	SERATUS DUA PULUH DUA
2345	4	DUA RIBU TIGA RATUS EMPAT PULUH LIMA
42760	5	EMPAT PULUH DUA RIBU TUJUH RATUS ENAM PULUH

The results of the rule-based algorithm test for writing Arabic numerals without the cents after the comma in Indonesian words use single and combined Arabic numerals in Table 3 as shown in Table 4.

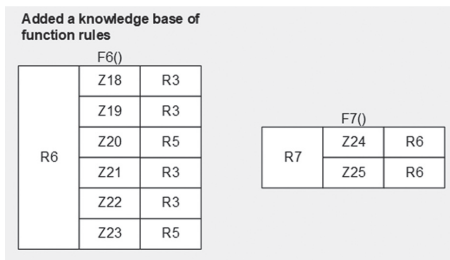
**Table 4.** Test Results Single and Combined Arabic Numerals in the R-Z Rules-Based System

Arabic Numerals	Output from the System	Result
0	<pre> USER INTERFACE Your deposit amount: 0 Arabic Numerals in Indonesian Words // NOL // </pre>	Correctly
1	<pre> USER INTERFACE Your deposit amount: 1 Arabic Numerals in Indonesian Words // SATU // </pre>	Correctly
10	<pre> USER INTERFACE Your deposit amount: 10 Arabic Numerals in Indonesian Words // SEPULUH // </pre>	Correctly
11	<pre> USER INTERFACE Your deposit amount: 11 Arabic Numerals in Indonesian Words // SEBELAS // </pre>	Correctly
12	<pre> USER INTERFACE Your deposit amount: 12 Arabic Numerals in Indonesian Words // DUA BELAS // </pre>	Correctly
120	<pre> USER INTERFACE Your deposit amount: 120 Arabic Numerals in Indonesian Words // SERATUS DUA PULUH // </pre>	Correctly
121	<pre> USER INTERFACE Your deposit amount: 121 Arabic Numerals in Indonesian Words // SERATUS DUA PULUH SATU // </pre>	Correctly
122	<pre> USER INTERFACE Your deposit amount: 122 Arabic Numerals in Indonesian Words // SERATUS DUA PULUH DUA // </pre>	Correctly
2345	<pre> USER INTERFACE Your deposit amount: 2.345 Arabic Numerals in Indonesian Words // DUA RIBU TIGA RATUS EMPAT PULUH LIMA // </pre>	Correctly
42760	<pre> USER INTERFACE Your deposit amount: 42.760 Arabic Numerals in Indonesian Words // EMPAT PULUH DUA RIBU TUJUH RATUS ENAM PULUH // </pre>	Correctly

Table 4 explains that the rule-based algorithm for writing Arabic numerals without the cent after a comma in Indonesian words has worked according to the design. From the system output in table 4, we can state that this rules-based algorithm can write Arabic numerals in Indonesian words correctly.

##### 4.2.2 Testing the system after adding new rules and facts

This section will test the algorithm for writing Arabic numerals without the cent after comma by adding some new rules and datums to the R-Z rules-based system. The new rules added are R6 and R7, as shown in Fig. 10.



**Fig. 10.** New rules R6 and R7 added to the R-Z rules-based system

While the data used to test the new rules added to the R-Z rule-based system are the R6 and R7 rules, as shown in Table 5.

**Table 5.** Test Data for New Rules R6 and R7

Arabic Numerals	The number of digits	Arabic Numerals In Indonesian words
842760	6	DELAPAN RATUS EMPAT PULUH DUA RIBU TUJUH RATUS ENAM PULUH
999999	6	SEMBILAN RATUS SEMBILAN PULUH SEMBILAN RIBU SEMBILAN RATUS SEMBILAN PULUH SEMBILAN
9842761	7	SEMBILAN JUTA DELAPAN RATUS EMPAT PULUH DUA RIBU TUJUH RATUS ENAM PULUH SATU
9999999	7	SEMBILAN JUTA SEMBILAN RATUS SEMBILAN PULUH SEMBILAN RIBU SEMBILAN RATUS SEMBILAN PULUH SEMBILAN
10000000	8	SEPULUH JUTA

The results of the rule-based algorithm test for writing Arabic numerals without the cents after the comma in Indonesian words after adding the new rules R6 and R7 to the system with the combined Arabic numeric test data are in Table 5, such as shown in Table 6.

**Table 6.** Test Results for Combined Arabic Numbers in the New Rules R6 and R7

Arabic Numerals	Output from the System	Result
842760	<pre> USER INTERFACE Your deposit amount: 842.760 Arabic Numerals in Indonesian Words // DELAPAN RATUS EMPAT PULUH DUA RIBU TUJUH RATUS ENAM PULUH // </pre>	Correctly
999999	<pre> USER INTERFACE Your deposit amount: 999.999 Arabic Numerals in Indonesian Words // SEMBILAN RATUS SEMBILAN PULUH SEMBILAN RIBU SEMBILAN RATUS SEMBILAN PULUH SEMBILAN // </pre>	Correctly
9842761	<pre> USER INTERFACE Your deposit amount: 9.842.761 Arabic Numerals in Indonesian Words // SEMBILAN JUTA DELAPAN RATUS EMPAT PULUH DUA RIBU TUJUH RATUS ENAM PULUH SATU // </pre>	Correctly

Arabic Numerals	Output from the System	Result
9999999	<pre> USER INTERFACE Your deposit amount: 9.999.999 Arabic Numerals in Indonesian Words // SEMBILAN JUTA SEMBILAN RATUS SEMBILAN PULUH SEMBILAN RIBU SEMBILAN RATUS SEMBILAN PULUH SEMBILAN // </pre>	Correctly
10000000	<pre> USER INTERFACE SORRY, I CAN'T WRITE THAT ARABIC NUMERALS I HAVE NOT LEARNED YET PLEASE TEACH ME THANK YOU </pre>	Incorrect

## 5. DISCUSSION

The R-Z rule-based system that applies forward chaining as reasoning can create artificial intelligence for writing Arabic numerals without the cent after a comma in Indonesian words.

This artificial intelligence can carry out assignments writing Arabic numbers without the cents after the comma in Indonesian words are given by the user correctly at 93.3%. The rest, which is 6.7%, is incorrect.

Enter with combined Arabic numerals, namely "1000000," cannot be written in Indonesian words by this artificial intelligence. It's because artificial intelligence has not yet learned about the combined Arabic numerals. This error is not an absolute error because an algorithm always gives right or wrong answers, and both the answers are all correct [22].

However, a simple artificial intelligence that implements the RZ rule-based system can write Arabic numerals without the cents after the comma in Indonesian words from the Arabic numerals symbols "0" to "99999", only applies the R rule of five and the Z rule of 17 before adding the rules in the system. With the added knowledge of R6 and R7 with many Z rules of 25 rules, the Arabic numerals symbol that can be written in Indonesian words by artificial intelligence is "9999999."

In interpreting and evaluating the facts in the knowledge base to provide Arabic numeric writing without the cent after a comma in Indonesian words, the inference engine uses the R-Z rules. The R-Z rules used in interpreting and evaluating facts in the knowledge base by the inference engine are as shown in table 7.

**Table 7.** Results of Inference Engine Reasoning on Test Arabic Numerals

No Test	Arabic Numerals	Results of the R-Z Rule in the Inference Engine
1	0	R1 Z1
2	1	R1 Z2
3	10	R2 Z3
4	11	R2 Z4
5	12	R2 Z5
6	120	R3 Z9 R2 Z6 R1

No Test	Arabic Numerals	Results of the R-Z Rule in the Inference Engine
7	121	R3 Z9 R2 Z6 R1 Z2
8	122	R3 Z9 R2 Z6 R1 Z2
9	2345	R4 Z12 R3 Z10 R2 Z6 R1 Z2
10	42760	R5 Z17 R3 Z10 R2 Z6 R1
11	842760	R6 Z23 R5 Z17 R3 Z10 R2 Z6 R1
12	999999	R6 Z23 R5 Z17 R3 Z10 R2 Z6 R1 Z2
13	9842761	R7 Z25 R6 Z23 R5 Z17 R3 Z10 R2 Z6 R1 Z2
14	9999999	R7 Z25 R6 Z23 R5 Z17 R3 Z10 R2 Z6 R1 Z2
15	10000000	Rules not found

Table 7 explains artificial intelligence begins to write Arabic numbers without the cents after the comma in Indonesian words when the inference engine has rules such as Z1, Z2, Z3, Z4, Z5, or Z6.

## 6. CONCLUSION

The experimental results show that a rule-based system can be applied to create artificial intelligence that mimics the ability of natural intelligence in writing Arabic numerals in Indonesian words.

Writing Arabic numerals in Indonesian words that artificial intelligence can do is still limited, starting from the single Arabic numerals "0" to the combined Arabic numerals "9999999".

This artificial intelligence will ask to get additional new knowledge when it meets Arabic numerals entered from an unknown user. The addition of rules and facts to artificial intelligence will increase the number of written Arabic numerals in Indonesian words.

Although it can imitate natural intelligence in writing Arabic numerals in Indonesian words, this artificial intelligence is not yet applicable in general. Because in the number system, there is an arrangement of Arabic numerals with Arabic numerals after the comma. Because there is an arrangement of Arabic numerals that applies in the number system, this artificial intelligence has not yet handled it.

Therefore, this simple artificial intelligence still needs to be developed to suit the existing number system in general.

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