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Mobile Application For Language Learning Systems

Hadi Suprayitno
Faculty Computing
President University
Bekasi, Indonesia
hadi.suprayitno@president.ac.id

Anugerah Heny
Faculty Computing
President University
Bekasi, Indonesia
Anugerah.Heny@president.ac.id[1]

***Abstract*— Language has a fundamentally social function. Processes of human interaction along with domain-general cognitive processes shape the structure and knowledge of language. Recent research in the cognitive sciences has demonstrated that patterns of use strongly affect how language is acquired, is used, and changes. This research is to develop an application for learning French, Korean, Japanese Palembang and Basa Jawa Languanges. Syntax, semantics and sentence structure for each language must be considered in the design. Android is chosen to make this application able to be used in mobile fashion. Gathering and Analyzing Data related to each language is conducted first before carrying out design and coding the system. Conclusion is withdrawn from the system testing and its evaluation results.**

Keywords—language, mobile application, complex adaptive system (CAS), language learning system, android platform.

I. INTRODUCTION

Processes of human interaction along with domain-general cognitive processes shape the structure and knowledge of language. Recent research across a variety of disciplines in the cognitive sciences has demonstrated that patterns of use strongly affect how language is acquired, is structured, is organized in cognition, and changes over time. However, there is mounting evidence that processes of language acquisition, use, and change are not independent of one another but are facets of the same system. We argue that this system is best construed as a complex adaptive system (CAS). This system is radically different from the static system of grammatical principles characteristic of the widely held generativist approach. Instead, language as a CAS of dynamic usage and its experience involves the following key features: (a) The system consists of multiple agents (the speakers in the speech community) interacting with one another. (b) The system is adaptive; that is, speakers' behavior is based on their past interactions, and current and past interactions together feed forward into future behavior. (c) A speaker's behavior is the consequence of competing factors ranging from perceptual mechanics to social motivations. (d) The structures of language emerge from interrelated patterns of experience, social interaction, and cognitive processes.

The term syntax refers to grammatical structure whereas the term semantics refers to the meaning of the vocabulary symbols arranged with that structure. Grammatical (syntactically valid) does not imply sensible (semantically valid). Each language has its own unique syntax and semantics in its sentence structure. Western and Eastern part of the world could contribute to this difference. Additionally, Korean and Japanese are also using unique characters in their language which is different from others. These differences will increase the difficulty in designing and developing such language learning system.

This research work is to develop a learning system for French, Korean, Japanese Palembang and Basa Jawa Languages. Android operating system is chosen as a platform to allow anybody learning languages using mobile smartphone. Android operating system is chosen as a platform to allow anybody learning languages using mobile smartphone. This is the way to learn languages while in mobile. Syntax, semantics and sentence structure must be first identified for each language before analyzing and designing an integrated language learning system. Conclusion will be drawn from results of system testing activity.

II. LITERATURE STUDY

In this chapter, literature review of languages will be described which focus on their syntax, semantic and sentence structure. Korean and Japanese languages will be reviewed first as they implement pictures instead of English Alphabet so that writing system must be considered. Explanation of Conversation, Grammar, Android version, Reasons to Choose Android for Application Development Solutions, SQLilte, and the Related Work follows.

A. Hiragana and Katakana

Hiragana and Katakana are the basic Japanese writing system, alongside with romaji and kanji. Both of them are categorized in kana. Kana are the characters that represent all of the sounds in the Japanese language. Altough both of them are derived from Chinese characters, the two serve different purposes and differ stylistically [5].

B. Hiragana

The first step in the development of hiragana was the appearance of manyougana (or kanji characters used to indicate pronunciation rather than meaning) in the 8th Century. Hiragana characters were created near the beginning of the Heian Period (794-1192) as simplified forms of whole kanji that conveyed sound rather than meaning [11].

At first, Hiragana is mainly used by women since they were not allowed to learn Chinese characters [4]. Because of that, Hiragana were originally called onnade, a women's hand [14]. However, this gender-based segregation of literacy eventually dissolved and Hiragana was became an accepted literary script [4].

Hiragana is one of the kana that commonly used to write native Japanese words [4]. Because of that, Hiragana is often used in materials for children, textbooks, animation and comic books, to write Japanese words which are not normally written with kanji, such as adverbs and some nouns and adjectives [14].

Hiragana is also sometimes written above or along side kanji to indicate pronunciation, especially if the pronunication is obscure or non-standard. Hiragana used in this way is known as furigana. In horizontal texts, the furigana appears above the kanji and in vertical texts, the furigana appears on the right of the kanji [14].

	k	s	t	n	h	m	y	r	w	
a	あ	か	さ	た	な	は	ま	や	ら	わ	ん (n nasal)
i	い	き	し	ち	に	ひ	み		り	ゐ*	
u	う	く	す	っ	ぬ	ふ	む	ゆ	る		
e	え	け	せ	て	ね	へ	め		れ	ゑ*	
o	お	こ	そ	と	の	ほ	も	よ	ろ	を	

* no longer in use

Fig. 1. List of Hiragana Character [4]

The current Hiragana characters exist are 46 characters. If we take a look at Fig 1, the Hiragana characters consists of 5 vowels (“a”, “i”, “u”, “e”, “o”), 1 singular consonant (“n”), and 40 combinations of consonant-vowel. Some combinations, like “yi”, “ye”, “wi”, “wu”, and “we”, are not used anymore or are not even exist. Some characters are not following the rule of consonant-vowel when spoken, such as “ti” is spoken as “chi” [4].

C. Katakana

Japanese was thought to be related to the Ural-Altaic family of languages, that includes Turkish, Mongolian, Manchu and Korean. An early form of Japanese existed from about the 3rd century AD. However, it wasn't until later that the Japanese gained the ability to write. The writing system they began to use was Chinese, imported from China and Korea along with a variety of technologies, political systems and Buddhism. It remains in the form of kanji symbols. However, the difficulty of adapting the Chinese kanji symbols to represent the sounds of the Japanese language resulted in the development of two phonetic "alphabets" of simplified Japanese symbols – and one of them is Katakana [11]..

Katakana used for writing words that are used for transcription of foreign language words into Japanese. Moreover, it can be used for onomatopoeia (words that phonetically imitates, resembles or suggests the source of the sound that it describes.), technical and scientific terms, for names of plants, animals, minerals, and often Japanese companies [10].

The current Katakana characters exist are 46 characters. The characteristic of the characters almost the same with Hiragana. However, Katakana is more straight lines and less curves, as the reader can see at Fig 2 [4].

	k	s	t	n	h	m	y	r	w	
a	ア	カ	サ	タ	ナ	ハ	マ	ヤ	ラ	ワ	ン (n nasal)
i	イ	キ	シ	チ	ニ	ヒ	ミ		リ	ヰ*	
u	ウ	ク	ス	ッ	ヌ	フ	ム	ユ	ル		
e	エ	ケ	セ	テ	ネ	ヘ	メ		レ	ヱ*	
o	オ	コ	ソ	ト	ノ	ホ	モ	ヨ	ロ	ヲ	

* no longer in use

Fig. 2. List of Katakana Character [4]

The additional sound rule and patalization also applies in Katakana, as you can see at the Fig 2.5 and 2.6. However, there are some differences. In Hiragana, it can use multiple vowels to extend the vowels’ length. However, in Katakana, to extend the vowel’s length, it using dash sign after the vowel. Moreover, there are some patalization that entirely different from Hiragana, since the words that use this characters is from another language. It can be seen at Fig 3 [17].

ガ ga	ギ gi	グ gu	ゲ ge	ゴ go
ザ za	ジ ji	ズ zu	ゼ ze	ゾ zo
ダ da	ヂ ji	ヅ zu	デ de	ド do
バ ba	ビ bi	ブ bu	ベ be	ボ bo
パ pa	ピ pi	プ pu	ペ pe	ポ po

Fig. 3. List of Katakana characters with Dakuten or Handakuten [13]

キャ kya	キュ kyu	キョ kyo	ギャ gya	ギュ gyu	ギョ gyo
ニャ nya	ニュ nyu	ニョ nyo	ヒャ hya	ヒュ hyu	ヒョ hyo
ビャ bya	ビュ byu	ビョ byo	ピャ pya	ピュ pyu	ピョ pyo
ミャ mya	ミュ myu	ミョ myo	リャ rya	リュ ryu	リョ ryo
ジャ ja	ジュ ju	ジェ je	ジョ jo	チャ cha	チュ chu
チェ che	チョ cho	シャ sha	シュ shu	シェ she	ショ sho

Fig. 4. List of Katakana characters patalization with combinaed with “ya”, “yu”, and “yo” characters [13]

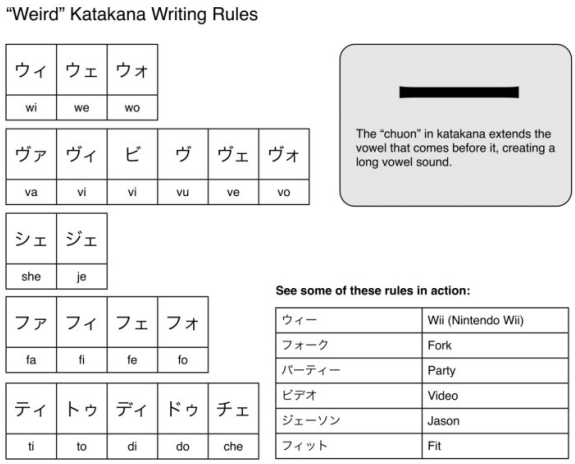

Fig. 5. List of special Katakana characters and the example of usage [17]

D. Korean Alphabets

Korean use their own unique alphabet called Hangul. Hangul was created under King Sejong during the Choson Dynasty (1393 - 1910). In 1446, the first Korean alphabet was proclaimed under the original name Hunmin chong-um, which literally meant "the correct sounds for the instruction of the people" [16].To learns Hangul, the first thing to do is probably learning how to write and read it. Different with English alphabet that has 26 characters. Korean has 40 characters, those categorized into two kind of character; those are 19 consonants, and 21 vowels.

E. Vowel

Korean has 21 vowels is use form the Korean words. Below is a list of the vowels in Korean:

Korean Alphabet	English Sound	Pronunciation Example
ㅏ	A	as in father
ㅑ	Ya	as in yacht
ㅓ	Eo	as in young
ㅕ	Yeo	as in young
ㅗ	O	as in yo yo
ㅛ	Yo	as in yo yo
ㅜ	U	as in cool
ㅠ	Yu	as in you
ㅡ	Eu	as in good
ㅣ	i	as in sheep
ㅐ	ae	as in pay
ㅞ	we	as in wet

Fig. 6. Vowel

F. Consonant

Korean has 19 consonants is use form the Korean words. Below is a list of the consonants in Korean:

Korean Alphabet	English Sound	Pronunciation Example
ㄱ	g (initial)	as in gold - kit
	k (final)	
ㄴ	n (initial)	as in near
	n (final)	
ㄷ	d (initial)	as in day - hat
	t (final)	
	t (final)	
ㅇ	silent	as in kingdom
	(initial)	
	ng (final)	
	k (final)	
ㅌ	th (initial)	as in toy
	th (final)	
ㅍ	ph (initial)	as in play
	ph (final)	
	pp (final)	
ㅆ	ss (initial)	as in smile - rat
	t (final)	
ㅉ	jj (initial)	as in joy - hat
	t (final)	

Fig. 7. Consonant

G. The Process of Writing in Korean Letters

The process of writing in Korean letters by Sri Endah Setia Lestari. Korean letters written from left to right and from top to bottom. Meanwhile, for the syllables / phrase in Korean can be written from left to right [6], such as:

한 글

Or from top to bottom, such as:

한
글

The following are the rules of writing of Korean syllable:

C+V

If vowel written in horizontally, so the pattern in the writing become cv, example ㄴ(c) + ㅏ(v) = 나

If vowel written in vertically, so the pattern in the writing become c, example ㄴ(c) + ㅗ(v) = 노
C+V+C
If vowel written in horizontally, so the pattern in the writing become cv, example ㄴ(c) + ㅏ(v) +ㄴ(c) = 난
If vowel written in vertically, so the pattern in the writing become c, example ㄴ(c) + ㅗ(v) +ㄴ(c) = 논
C+V+C+C
If vowel written in horizontally, so the pattern in the writing become cv, example ㅅ(c) + ㅏ(v) + ㄹ(c) + ㅎ(c) = 삻
cc
If vowel written in vertically, so the pattern in the writing become c, example ㅅ(c) + ㅗ(v) + ㄹ(c) + ㅎ(c) = 솷
Note:
C : Consonant
V : Vowel

H. Boyer-Moore Algorithm

The algorithm of Boyer and Moore compares the pattern with the text from right to left. If the text symbol that is compared with the rightmost pattern symbol does not occur in the pattern at all, then the pattern can be shifted by m positions behind this text symbol.
Example:

0 1 2 3 4 5 6 7 8 9 ...

a b b a d a b a c b a

b a b a c

b a b a c

The first comparison d-c at position 4 produces a mismatch. The text symbol d does not occur in the pattern. Therefore, the pattern cannot match at any of the positions 0, ..., 4, since all corresponding windows contain a d. The pattern can be shifted to position 5. The best case for the Boyer-Moore algorithm is attained if at each attempt the first compared text symbol does not occur in the pattern. Then the algorithm requires only O(n/m) comparisons

If there are only a constant number of matches of the pattern in the text, the Boyer-Moore searching algorithm performs O(n) comparisons in the worst case. The proof of this is rather difficult. In general Θ(n•m) comparisons are necessary, e.g. if the pattern is am and the text an. By a slight modification of the algorithm the number of comparisons can be bounded to O(n) even in the general case. If the alphabet is large compared to the length of the pattern, the algorithm performs O(n/m) comparisons on the average. This is because often a shift by m is possible due to the bad character heuristics.

The Boyer-Moore algorithm uses two different heuristics for determining the maximum possible shift distance in case of a mismatch: the "bad character" and the "good suffix" heuristics [11]. Both heuristics can lead to a shift distance of m. For the bad character heuristics this is the case, if the first comparison causes a mismatch and the corresponding text symbol does not occur in the pattern at all. For the good suffix heuristics this is the case, if only the first comparison was a match, but that symbol does not occur elsewhere in the pattern.

The preprocessing for the good suffix heuristics is rather difficult to understand and to implement. Therefore, sometimes versions of the Boyer-Moore algorithm are found in which the good suffix heuristics is left away. The argument is that the bad character heuristics would be sufficient and the good suffix heuristics would not save many comparisons. However, this is not true for small alphabets. Conversation

Conversation is an expression and words in French, greeting phrases or simply if users want to know what to say when chatting. Most of the sentences on this application are using for the everyday life conversation, so users might come handy if users memorize them.

I. Greeting

In French Language, only know bonjour and bonsoir [bongswar]. While in language type non-formal, there is word salut which same with hi in English language, and there is term bonne nuit [bon nwi]. Literally, bonne it means good and nuit is night, but bonne nuit not used as to greeting someone at evening. ”Good Evening” in French Language is a represented ordinary by word bonsoir. That is, the use of bonne nuit same with good night, which is more likely on the meaning of “good rest” [18].

J. Introduction

Question “çava?” used to say hello to someone. Literally, this question means “be?” which refers to the physical state of a person. How to question in more formal is a by using comment “allez-vouz?” With this question, person can answer by using çava as answer, which more or less it is means ”fine”. Adverb “bien” means “good”, and can be used as an answer separately or combined with “çava” became “çavabien”. The word “bien” often of preceded with other adverb to show the levels, which intended [19].

In Conversation, there are two example categories to Conversation such as: Shopping and Post Office. In this category will be explained how to user to pronunciation when user in the market or post office.

K. French is an International Language of Reference [17]

According to the Constitution of France, French has been the official language since 1992 (although previous legal texts have made it official since 1539, see ordiance of Villers - Cotterêts). France mandates of the use of French in official government publications, public education except in specific cases (though these dispositions are often ignored) and legal contracts; advertisements must bear a translation of foreign words. In addition to French, there are a variety of regional languages and dialects. France has signed the European Charter for Regional Languages, but has not ratified it since that would go against its 2958 Constitution.

French is one of the working languages of the United Nations alongside English, Spanish, Russian, Arabic and Chinese. It is one of the three procedural languages of the European Union, along with English and German, and the sole language used for the deliberations of the Court of Justice of the European Union.

French plays a special role in international sporting life as an official language of the International Olympic Committee (IOC) and hence of the Olympic Games. The inauguration in 1989 of the Francophone Games has underscored the existence of real international French – speaking sports community.

III. MOBILE APPLICATION: ANDROID

Android is a Linux-based operating system designed primarily for touch screen mobile devices such as smart phones and tablet computers, developed by Google in conjunction with the Open Handset Alliance. Android is a software stack for mobile device covering operating system, middleware, and core applications, which was release by Google. While the Android SDK (Software Development Kit) provides the tools and APIs necessary for developing applications on the Android platform using the Java programming language. Developed in conjunction between Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, NVIDIA incorporated in the OHA (Open Handset Alliance) with the aim of creating a best standard for the mobile device [20].

Programming language that runs on Android is Java. Besides, Android also provides the tools and APIs needed during the making of the program. Android has some features and has architecture [20].

A. Android Features

Features available on the Android platform currently include [16]:

- Application framework
- Dalvik virtual machine
- Integrated browser
- SQLite
- Media support
- Bluetooth, EDGE, 3G and Wifi
- Multi touch
- Development environment
- Google Play (Android Market)

B. Android Architecture

1) Linux Kernel

Android is not Linux, but Android is built on Linux Kernel, that is version 2.6 so that reliability can be trusted. For core system services such as security Linux used, memory management, process management, network, and driver model. Kernel also acts as an abstraction layer between the hardware and its software stack [26].

Libraries

Android includes libraries C / C + + used by the various components of the Android system. This capability is provide to applications developer through the Android Application Framework [20].

Android Runtime

Android consists of a set of core libraries that provides most of the functions are the same as those in the core libraries Java programming language. Each application runs process itself in Android, with each instant of the Dalvik Virtual Machine (dalvikvm). Dalvik is designed to a device can run multiple VMs efficiently. Dalvik machine executes file in Dalvik Virtual executable (.dex), a format that is optimize for small memory. Dalvik VM-based, runs and compiled by a Java language compiler which has been transformed into the .dex format by the tool "dx" that have been included. Dalvik VM relies on the Linux kernel to function, such as threading and memory management lower level [20].

2) Application Framework

Developers have full access to the API framework that same as that used by the core applications. Application architecture designed so that components can be reuse easily. Each application can take advantage of this capability and other applications that may use this capability (in accordance with the security constraints defined by framework). The same mechanism allows components to be replace by the user. All applications are circuit set of services and systems, including Views, Content Provider, Resource Manager, Notification Manager, and Activity Manager [20]

Applications

Android already includes core applications such as an email client, SMS, calendar, maps, browser, contacts, and others. All applications are write using the Java programming language. In this layer, we put the application developer or the made. What are special are either all applications on Android core applications (native) and third-party applications running on application layer using the same API libraries. This means all applications made for android would have equal access to access all handset capabilities, regardless of whether it is a core application or applications third party. In other words, with this android platform, programmer or developer in full will be customizing your Android device [20].

C. JSON

JSON (JavaScript Object Notation) is a lightweight data-interchange format. It is easy for humans to read and write. It is easy for machines to parse and generate. It is based on a subset of the JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999. JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others. These properties make JSON an ideal data-interchange language [12].

JSON is built on two structures:

- • A collection of name/value pairs. In various languages, this is realized as an object, record, struct, dictionary, hash table, keyed list, or associative array.
- • An ordered list of values. In most languages, this is realized as an array, vector, list, or sequence.

These are universal data structures. Virtually all modern programming languages support them in one form or another. It makes sense that a data format that is interchangeable with programming languages also be based on these structures.

There are some common instances in JSON, those are object, array, value, string, and number. An object is an unordered set of name/value pairs. An object begins with {

(left brace) and ends with } (right brace). Each name is followed by : (colon) and the name/value pairs are separated by , (comma) [12].

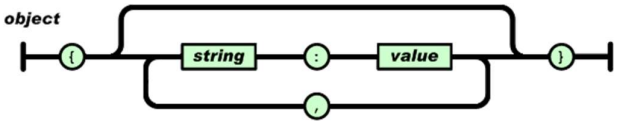

Fig. 8. Object representation in JSON [11]

An array is an ordered collection of values. An array begins with [(left bracket) and ends with] (right bracket). Values are separated by , (comma).

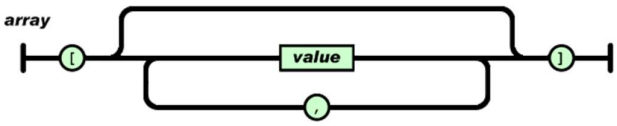

Fig. 9. Array representation in JSON [12]

A value can be a string in double quotes, or a number, or true or false or null, or an object or an array. These structures can be nested.

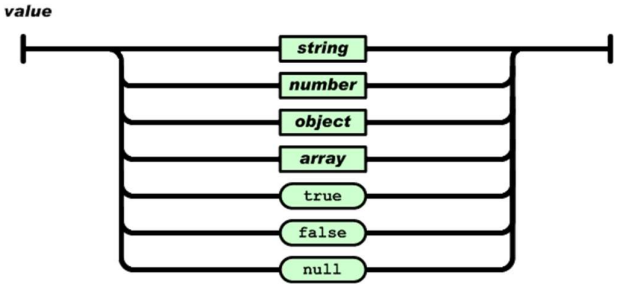

Fig. 10. Value representation in JSON [12]

A string is a sequence of zero or more Unicode characters, wrapped in double quotes, using backslash escapes. A character is represented as a single character string. A string is very much like a C or Java string.

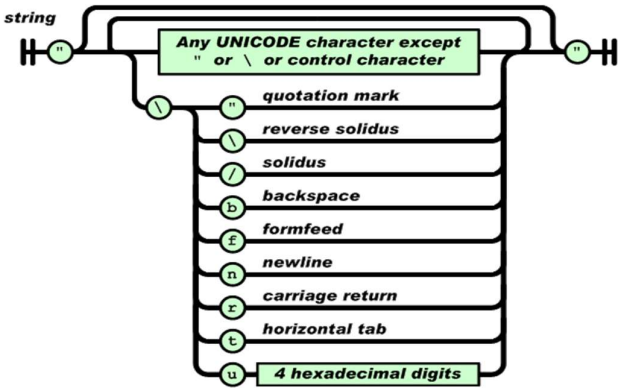

Fig. 11. String representation in JSON [12]

A number is very much like a C or Java number, except that the octal and hexadecimal formats are not used

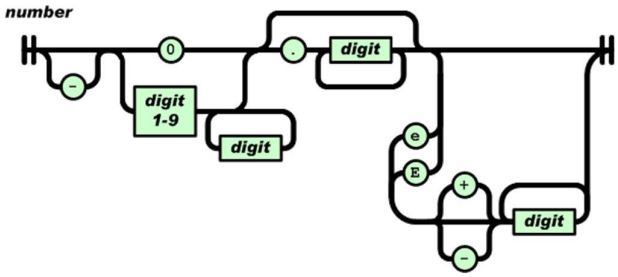

Fig. 12. Number representation in JSON [12]

IV. RESEARCH METHODOLOGY

A. Rapid Application Development

System Development life Cycle (SDLC) is generic model for developing application software. However, the environment of the system development is different such that some phases in the model can be ignored. Because of that, Rapid Application Development (RAD) is adopted in developing this learning languages system. Furthermore, "RAD is a development of a lifecycle designed to give much faster development and higher-quality results than those achieved with the traditional lifecycle. It is designed to take the maximum advantage of powerful development software that has evolved recently" [14].

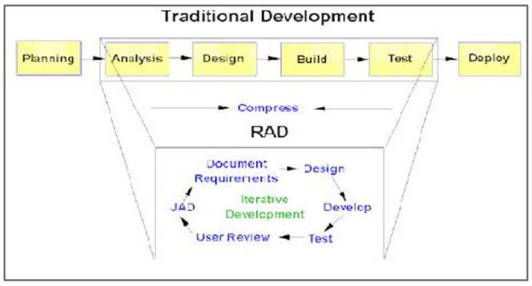

Fig. 13. RAD Methodology [3].

RAD compresses the step-by-step development of conventional methods into an iterative process (see Fig 2.1 above). The RAD approach thus includes developing and refining the data models, process models, and prototype in parallel using an iterative process. User requirements are refined, a solution is designed, the solution is prototyped, the prototype is reviewed, user input is provided, and the process begins again.

The challenges facing software development organizations can be summarized as more, better, and faster. The RAD development path attacks these challenges head-on by providing a means for developing systems faster, while reducing cost and increasing quality. Fundamentals of the RAD methodology thus include:

- Combining the best available techniques and specifying the sequence of tasks that will make those techniques most effective.
- Using evolutionary prototypes that are eventually transformed into the final product.
- Using workshops, instead of interview, to gather requirements and review design.

- Selecting a set of CASE tools to support modeling, prototyping, and code reusability, as well as automating many of the combination of techniques.
- Implementing time boxed development that allows development teams to quickly build the core of the system and implement refinements in subsequent releases.
- Providing guidelines for success and describing pitfalls to avoid.

B. The RAD model consists of five major phases:

1) Requirement Gathering

In this phase, all the information that is needed in creating the application is collected. Analysis is also needed in this phase such as analyzing information that is supported and generated in the application and the constraints that will be faced.

2) Designing

In this phase all the information already gathered from the requirements gathering phase is enhanced into a set of data objects (entities) required to support the application. Attributes (character entities respectively) are identified and relationships between data objects (entities) are defined, such as: Use-Case Diagrams, and Activity Diagrams.

3) Developing

In this phase, the system development is conducted and it consists of the activities to identify the prototype, and build models of the software.

4) System Testing

Although the application has been tested in the previous phases and it reduces overall testing time, but new component and all the interfaces should be tested more thoroughly to avoid errors.

5) Deployment

After testing and corrected some errors in the system testing phase, the application is available for use. If the application is still not ready to run in a live operation, then User reviews will become the next iteration phase in an effort to enhance system prototype.

V. RESULTS & DISCUSSION

Results will be taken from System testing which is a designed to examine the functions contained in the application. System testing is performing by running the application. By doing system testing, the application can achieve the expected results. Furthermore, system testing is performed to determine whether the application works or still has bugs. There are two points discussed in system testing and evaluation i.e. testing scenario, and evaluation

A. Scope and Limitation

The test to be run is based on the system's functionalities. Application can run in any Android devices with minimal version 2.2 (Froyo). User can choose the desired menu; Conversation, Grammar, or Example. In menu Conversation and Grammar, user can choose each category and learn with the translation and sound of all examples. In Exercise menu, user must choose the correct answer for each question and then the result will appear.

B. Module Development

There are three main modules developed to handle the primary functionality of the system. Those are Engine module, Helper module, and View module.

1) Engine Module

The engine modules represent the main engine of the system. There are three classes act as engine modules; each of the class has each different function. The classes are FindWord.java, NumberScan.java, and Jawa.java. FindWord Class has a duty to find the word translation of each word by matching the key in the XML file with the input string. This is the main function of the translation, which is connecting the classes with the resource words in the XML file. The method is typed String array and will return string array consisting of the translation word result. In Fig 14, it shows that the method will match input strings with the key in XML file. If it is matched, it will fill the string array with the translation.

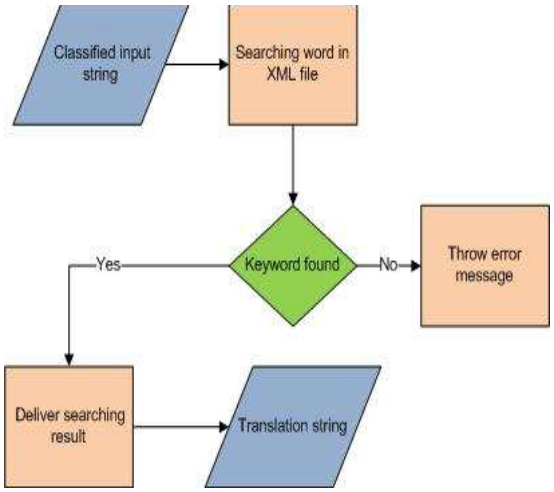

Fig. 14. Flowchart for FindWord.java

Fig 14 shows the process flow of FindWord class. After the input string has been classified, system will search the translation by matching the keyword in XML file. If the keyword is found, system will deliver the searching result, otherwise system will throw an error message. NumberScan class has duty to get translation of any number given by the input. The method is typed String and will return string of the translation number result.

In the process flow of number translation, the input number will be classied whether it is more than one thousand or not. System will count the mod of the number which is less than one thousand, then translate it directly into Basa Jawa. After the translation has been found, system will deliver the translation result as a string.

Jawa class has duty to play the pronunciation sound of the translation result. After the translation has been found, it will be parted into set of syllables. Each syllable is used as the sound path. Then it will be put into an Arraylist based on the order, and later the path Arraylist will be used as a parameter call the method to play the sound.

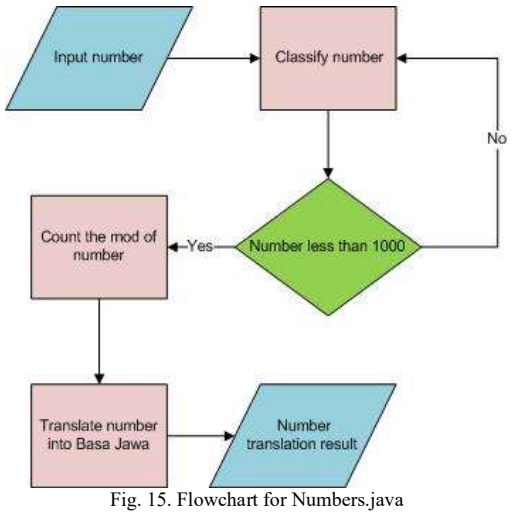

Fig. 15. Flowchart for Numbers.java

Fig. 16 shows the process flow of playing translation sound in Jawa.java. The list of translation syllables is determined as a pathlist for matching each sound file. Once the sound file is found, system will prepare the player, and then play the syllable sound. After each sound has been played, system will look up to the pathlist whether it is empty or not. If pathlist is not empty yet, system will do the process all over again; otherwise system will reset and stops the player.

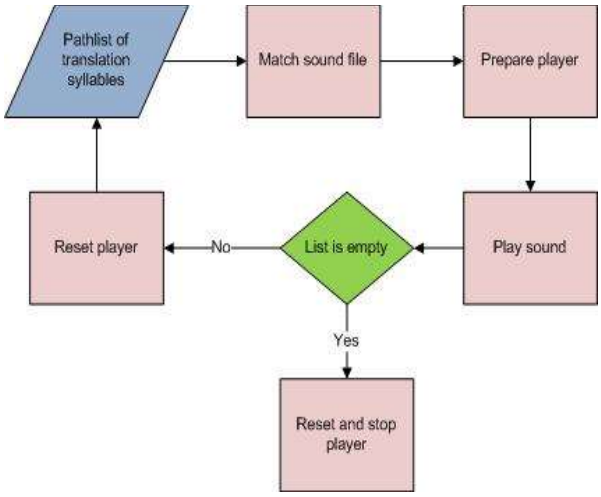

Fig. 16. Flowchart for Jawa.java

2) Helper Module

Helper module has function as a helper for the engine module and view module. It will be called by view modules to help it to get a parameter to be sent to engine modules. There are two classes act as helper module; SyllableScan.java and ConvertNumber.java. These classes are used by view modules in making the right parameter to be sent to engine modules for further processing.

C. Figures and Tables

SyllableScan class has duty to scan the whole translation result word per word and build it into a set of syllables. It is called by the view module after the complete translation word or number or sentence has been found. The parameter to call this class is the string of translation result. In this stage, each word of the translation result will be scanned and parted into syllables. The method in SyllableScan will return an ArrayList contains ordered sound paths list of translation word or number or sentence, which is later will be sent as a parameter for calling the Jawa class to play the pronunciation sounds of the translation result.

ConvertNumber class has duty to convert some of the number translation result into certain pronunciation to fulfill the condition before being parted into a set of syllables. Parameter to call the method in this class is the string of number translation result. The method returns string value of the converted number pronunciation, which is later used as the parameter to call SyllableScan class.

1) View Module

View module has function to render all of the information that is being presented to the user. There are four classes act as view modules for this application; Words.java, JawaSearchActivity.java, Numbers.java, and Translation.java, and JawaMainActivity.java.

Words class is responsible to handle the view of the whole available words in the application. The words resource is taken from the XML file, which contains all of the words and translations.

Method for the view of available words in XML file presents the action when the words button is clicked by user. It will call the engine module and helper module to get the view of the clicked words button's translation. Meanwhile, for the process of getting the words directly from the XML file, it will call the methods setUpIDs and getWords in Words class.

JawaSearchActivity class is responsible for rendering the view of searching field. Searching field itself is used for checking the available words in the XML file. This class also performs the method for matching the input word with the words in XML file, which calls the engine module and helper module to help it get the view of the result.

Numbers class is responsible to handle the view of the instant common numbers that is often used in user's daily conversation. The numbers resource is taken from the XML file, which contains a few common numbers

Method for the view of common numbers in XML file presents the action when the numbers button is clicked by user. It will call the engine module and helper module to get the view of the clicked numbers button's translation. Meanwhile, for the process of getting the common numbers directly from the XML file, it will call the methods setUpIDs and getNumbers in Numbers class.

Translation class is responsible for rendering the view of 'Translate' field. Translate field itself is used for translating any words, numbers, or a complete sentence. This class perform the method for matching the input words with the words in XML file, whether the words are available or not, and also for translating input numbers, which calls the engine module and helper module to help it get the view of the result.

JawaMainActivity class is responsible for rendering the main view of the whole tabs and menus in the application. This class arranges the placement of each menu and tab. This class also navigates all tabs and menus when one of them is chosen by user.

D. Testing Environtment

Testing environment is the system functionalities that used for testing the French Daily Conversation application. With some certain hardware and system, the application will be required the scope and limitation of the system testing. The application will be the tested using the following hardware and software with specifications as:

- Microsoft Windows 7 Operating System
- Eclipse IDE for Java Developers
- Android Virtual Device (Android version 2.2 Froyo)
- Samsung Galaxy Young (Android version 2.3 Gingerbread)
- Samsung Galaxy Advance (Android version 4.0 Ice Cream Sandwich)
- Samsung Galaxy SIII Mini (Android version 4.1 Ice Cream Sandwich)

Testing Scenario is a conducted in several sections: Main Menu Handling Section, Conversation Handling Section, Grammar Handling Section, Exercise Handling Section, and Exit Handling Section.

E Main Menu Handling Section

In the Main Menu Handling Section, French Daily Conversation Application is test by running the application. The user chooses the menu buttons to direct into the menu's frame. The user to go to the intended frame can use the buttons. Table 1 is the scenario table of the Main Menu Handling Section

Table 1 Main Menu Handling Section

No.	Scenario	Expected Result	Result
1.	Conversation menu.	Conversation sub menu frame is loaded.	As expected
2.	Click "Conversation" button.	Grammar sub menu frame is loaded.	
3.	Grammar menu.	Exercise menu frame is loaded.	
4.	Exit menu. Click "Exit" button.	The application stop and exit.	

1) E.1 Conversation Handling Section

System testing in the Conversation is a performed after the user selects the Conversation menu on the main menu. There are two points that must be test in the Conversation frame. First, check the submenu buttons. Second, check the categories, list view and sounds. The user checks all the buttons one by one. The user also matches the list view, and the sounds. Table 2 is the scenario table of the Conversation Handling Section

Table 2 Conversation Handling Section

No.	Scenario	Expected Result	Result
1.	Conversation sub menu. Click "Conversation Sub Menu" buttons.	Conversation sub menu category frame is loaded.	As expected
2.	Conversation detail list. Click "Conversation" detail list.	Conversation category list loaded, detail list view loaded, and sound loaded.	

2) E.2 Grammar Handling Section

System testing in the Grammar is a performed after the user selects the Grammar menu on the main menu. There are two points that must be test in the Grammar frame. First, check the submenu buttons. Second, check the category, list view and sounds. The user checks all the buttons and menu in the list one by one. The user also matches the list view, and the sounds. Table 3 is the scenario table of the Grammar Handling Section

Table 3 Grammar Handling Section

No.	Scenario	Expected Result	Result
1.	Grammar sub menu. Click "Grammar Sub Menu" buttons.	Grammar sub menu category frame is loaded.	As expected
2.	Grammar detail list. Click "Grammar" detail list.	Grammar category list loaded, detail list view loaded, and sound loaded.	

3) E.3 Exercise Handling Section

System testing in the Exercise is a performed after the user selects the Exercise menu on the main menu. There are

two points that must be test in the Exercise frame. First, check the question display. Second, try to answer and view the result. The user checks all the buttons and result one by one. Table 4 is the scenario table of the Exercise Handling Section

Table 4 Exercise Handling Section

No.	Scenario	Expected Result	Result
1.	Exercise button. Click "Exercise" button.	Exercise frame is loaded.	As expected
2.	Exercise question and result. Click "Exercise" answer.	Exercise result will appear.	

4) E.4 Exit Handling Section

It is a conducted on the exit menu button. When the user completed all the learning and exercise, the user can select the exit menu button. On the other hand, whenever the users want to exit, the user can back into the main frame. After that, the system will stop the application. There three points that must be tested in the Exit section. Table 5 is the scenario table of the Exit Handling Section

Table 1 Exit Handling Section

No.	Scenario	Expected Result	Result
1.	Back button in mobile device Click "Back" button..	The application is close	As expected

VI. CONCLUSIONS & FUTURE WORKS

These conclusions are withdrawn from testing results and evaluation of the Language Learning System as follows:

(1) The use of the Language Learning System is quite flexible as it has been developed on the Android OS environments.

(2) The system provides Korean and Japanese language learning materials, includes their unique alphabet and audio pronunciation to speak their Languages. Thus the users have a chance to understand more deeply about these two languages.

(3) Having implemented this system, users have new experiences and more alternatives in learning languages, especially when they use mobile device.

Although the system development has been done, but it still requires some improvements or added features as follows;

(1) Some Japanese and Korean Alphabet needs to be added to improve the system in presenting fully complete Alphabet as these languages use pictures instead of English Alphabet.

(2) Current system just provides learning materials for Japanese, Korean, French, English, Palembang and Basa Jawa Languages. Adding learning material from other languages will enhance the system capability in helping people learning languages.

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