Title: Preliminary Proposal for Encoding New Hangul
characters
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Status: Individual Contribution
Date: 2017-04-27

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1. Introduction.
This is a preliminary proposal for encoding the new characters for "Hangul", in CJK Range Unicode. Hangul is Korean writing system. The 11,172 syllables and the 254 components (Hangul Jamo) have been included in Hangul Unicode, since 1996. Since then, those characters must have been the Hangul-Unicode standards to normalize communication. The Unicode standards have been changed and expanded along with the advancing IT technology. These new characters will give a vast improvement of online communications for all using Korean.

2. Background.
Hangul, invented in the 15th century, is being used by over 80 million people around the world, including North and South Korea. Before it was invented, Koreans had borrowed Chinese characters over a thousand years. The Chinese characters were very complicate system; and moreover, they were not suitable for Korean language even though they modified the pronunciation of those characters. Therefore, most people were illiterate. The King Se-Jong expressed in his book of "Declaration of Inventing New Scripts for the People (Hoon-min-jung-um)", that he wanted his people be literate, and was the reason he invented this scripts.
When Hangul was invented, spoken Korean did not use the sounds, like /f/, /v/ and /z/, and did not discriminate the sounds between /r/ and /l/. Also, Hangul was not invented to indicate those sounds in writing. Recent decades, Koreans started to borrow English words. It is impossible to distinguish between words, such as "past" and "fast", "best" and "vest", "rate" and "late" with Hangul.
These days, Koreans are using more English loan words. Even though Hangul remains unable to indicate many of the phonetic sounds used in English, they are communicating in writing via social media more often than verbal communication. Therefore, more confusion and ambiguity occur since more English words are borrowed. The last updated Hangul-Unicode was in 1996. For over the course of the past twenty years, there has been increasing demand for Korean people to write English loan words as accurately as they sound in Hangul in order to avoid confusion and ambiguity.
Alphabet has a history of more than 3000 years. Many countries in the world have borrowed alphabet letters and modified them into their own. This project will be borrowing some alphabet characters, and re-characterizing them into Hangul format.

3. Structure.

Hangul is a phonological system of Korean characters. It is classified into the components and the syllables. Chinese characters are the hieroglyphics. A lot of Chinese characters was created by combining of the different hieroglyphic components in a square block, and then the additional meanings had derived from it. The syllables in Hangul would look similar to Chinese characters. A lot of Hangul syllables for phonetic sounds were made from the various combination of the Hangul components within Hangul lettering rule. The writing within Hangul is the display of assembled sets of syllables in a line. It can be displayed from top to bottom. However, left to right is more common use in modern days.

4. Components.

Within Hangul, a syllable is the basic unit of representing human voice. The human voice is considered to consist of the vowel element (component) and the consonant element, and the syllables are being the composition of components. Therefore, the components in Hangul are representing the elements of the sounds, and also being the particles for the syllabic set, it does not make any sounds by itself. The components are classified into the vowels and the consonants. The vowel and the consonant must be combined together, in order to be representing a sound. If a syllable is compared with an atom, a vowel and a consonant would be a nucleus and an electron. The vowels and the consonants can be distinguished by its distinctively different figure. The vowels are shaped like structural logs that are used in building a house or the frames that are used in industrial products.

5. Vowels. : ㅏ,ㅓ,ㅣ,ㅑ,ㅕ (vertical)   ㅗ,ㅜ,ㅡ,ㅛ,ㅠ (horizontal)

The vowels in Hangul are the vowel elements of the vowel sounds. They do not represent any sound by itself yet. There are a null phonetic consonant in Hangul (ㅇ:no sound / ~ng sound for final). When a vowel is combined with this null sound consonant, then it will make that vowel sound. The vowels could be classified into the vertical and horizontal type vowels. A consonant(s) will be attached (assembled) to the top of the horizontal vowels, such as "ㅗㅠㅡ", then it will be "오듀뜨". In addition, the left side of the vertical vowels, like "ㅏ ㅕ ㅣ", then it will be "하며리". All of the assembled sets (syllables) in Hangul are in a block shape.

* Combining the vowels

basic: ㅏ ㅑ ㅓ ㅕ ㅗ ㅛ ㅜ ㅠ ㅡ ㅣ

combination: ㅘ ㅚ ㅝ ㅟ ㅢ ㅔ ㅖ ㅐ ㅒ ㅞ ㅙ

The design of the vowels are very suitable to be combined together. If the vowel "ㅗ(/o/)"and "ㅏ(/a/)" are combined together suchlike "ㅘ", it won't make any phonetic sound yet, because it lacks the consonant element. But the "ㅘ" will be the new vowel component that will represent the compressed compound sound of "/o/" and "/a/". Try to keep compressing the sound of "/o/" and "/a/" (try to say oh & ah really

fast number of times~) to make it into one sound. Eventually, it will sound "wa(와)".

The "wa" is not a vowel in English, however, the "ㅘ" is a vowel; therefore, it can be combined with any consonants, suchlike "솨,와,쏴". Some of the combined vowels will be used for the new vowel component (combination vowel).
The combining vowels are complicated, but also logical.
The horizontal vowels are combined with the vertical vowels suchlike "ㅘ ㅚ ㅝ ㅟ ㅢ ㅞ ㅙ", and that will represent the compound compressed sound of both vowels.

The "ㅗ(/o/)+ㅏ(/a/)" will be "ㅘ(/wa/)", the ㅗ(/o/)+ㅣ(/i/)" will be "ㅚ(woe)", the "ㅜ(/u/)+ㅓ(/e/)" will be "ㅝ(/wer/)", the "ㅜ(/u/)+ㅣ(/i/)" will be "ㅟ(/wie/), and so on.

The "ㅣ" is a simplest shaped vertical vowel, and it is a suitable shape to be combined even with other vertical vowels, suchlike "ㅐ,ㅔ,ㅒ,ㅖ". And these combinations will be used for the additional vowel components. The "ㅐ" and "ㅔ" are for the "/a/ in sand", "/e/ in egg". The "ㅣ" is also combined with the horizontal vowels, suchlike "ㅟ,ㅚ,ㅢ".

The sound "ㅣ(/i/ : ie)" is also used for the compounding sound of the double projecting type vowels, suchlike "ㅑ, ㅕ,ㅛ, ㅠ, ㅖ, ㅒ,". This means the "ㅑ" is the combined compressed sound of "ㅣ(/i/)" and "ㅏ(/a/)", which becomes "/ya/". In the same way, the "ㅕ" is "ㅣ(/i/)"+"ㅓ(/e/)" equals to" /yeo/", and "ㅛ"is "ㅣ(/i/)"+"ㅗ(/o/)" equals to "/yo/" and so on.
There are 21 vowels in current Korean writing system including the basic and the combination vowels. Combination vowels can express far more verbal expressions beyond diphthongs in English.

6. Consonants.
basic: ㄱ ㄴ ㄷ ㄹ ㅁ ㅂ ㅅ ㅇ ㅈ ㅊ ㅋ ㅌ ㅍ ㅎ

combination:ㄲ ㄸ ㅃ ㅆ ㅉ / ㄳ,ㄵ,ㄶ,ㄺ,ㄻ,ㄼ ㄽ ㄾ ㄿ ㅀ ㅄ

The consonants in Hangul are the consonantal elements of a sound. They do not represent any sound by itself. The consonants are classified into the initial and the final of the syllables.
The initial will be attached to the front (or atop) of the vowel to be the beginning phonetic sound of the syllable.
The final will be attached at the bottom of the assembly set, and it is also called the base (or prop) of the syllables, that is named after the figure of the syllables.
The final will be the closure sound (ending phonetic sound) of the syllable, when the final is needed. (/m/ in Tom)

The design of consonants are good to be the attachment to the vowels. If the consonants only combined together, it would not make any sounds. Some of the combined consonants are used for the additional consonantal components that represent an additional sound or an additional grammatical meaning.

7. Implementation.
The design and the theory of Hangul are well matched with the lettering rule of Hangul. The syllable in Hangul is the combination of the components in a block. Final set would look like it is in indivisible square as each set is unified. The vowel(s) being the frame of the lettering structure of the block. Once the consonant(s) is attached to the vowel, then it will be a complete syllable(s).
There could be more or less components in the same size block. The size of the components will be smaller when there are more components in a block. (ie: "ㄹ" in 로, 롸, 롦) The syllable with the base (final) consonant will be looked like two story complexion, "보-봉 or 벼-벽".

8. Syllables.
Hangul is very logical and mathematical. The current Hangul Syllables in Unicode are the combination number of the utilized Hangul Jamo components. The Jamo means the consonants (Ja) and the vowels (mo). The components are included the basic and the combination components. Among the 254 Hangul Jamo components, 19 initial consonants, 21 vowels and 27 final consonants are currently used in Hangul Unicode Syllable. The combination number for the syllable without bottom consonants (final) is 19x21=399. All of each of those syllables can be combined with 27 final consonants (the number of the combination will be 399x27= 10,783). The grand total number of combinations is 399+10,783=11,172, and this is the number for the syllables in current Hangul Syllables in Unicode. Among the 27 final consonants, 11 double consonants are for the distinguished grammatical meaning, and that combination number is 399x11=4,389. However, only 65 syllables out of 4,389 combinations are used to distinguish grammatical meaning in current Korean language. Therefore, over 4,300 characters in Unicode are not being utilized.

9. Implementing the Project.
This project is adding more characters to accurately write expressions for the foreign loan words. The people will have the option to use it when they want to avoid confusion and/or ambiguity. Within Hangul, the syllables represent the sounds; therefore, new syllables are needed to add additional expressions. In addition, new components are needed to extend new syllables. Accordingly, new components and new syllables are needed to be encoded for this project.

10. Re-characterizing
The "ㅡ" in Hangul is a vowel which corresponding character is not in alphabet. But every alphabetical consonants are considered to contain that sound inherent within Hangul. This project is the borrowing of alphabet consonants of "F-V-Z-R-TH" into

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Hangul. In order for those characters to be implemented by other Hangul components, the "ㅡ" sounds have to be removed from those characters. This means those alphabet letters will have to be re-characterized into the new Hangul consonantal component; and then, its consonantal roles in Hangul will be determined by usage for the initial, final or both phonemes.

11. Components for the project: New consonants need to be encoding.
: No new vowels need to be encoding.

a) Vowels: from Unicode.

- 8 utilizing vowels: ㅏ, ㅓ, ㅣ ,ㅗ,ㅜ,ㅡ, ㅐ, ㅔ, [A,E,I,O,U, inherent, A,E,]

- 6 non utilizing vowels: ㅛ ㅑ, ㅛ , ㅕ, ㅠ, ㅖ
[from Unicode Chart: #4470/1176, #4504/1198, #4472/1178, #4478/117E, #4489/1189, #118C]

b) Consonants.
 Consonants in Hangul are used for the initial or the final of the syllables. But some consonants are only used for the initial, some consonants are only for the final. The initials will be located at the upper portion, and the finals will be located at the bottom portion of Unicode space.

Reference:

Initial;

Hangul Jamo[1] Official Unicode Consortium code chart (PDF)																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
U+110x	ㄱ	ㄲ	ㄴ	ㄷ	ㄸ	ㄹ	ㅁ	ㅂ	ㅃ	ㅅ	ㅆ	ㅇ	ㅈ	ㅉ	ㅊ	ㅋ
U+111x	ㅌ	ㅍ	ㅎ	ㄲ	ㅥ	ㅦ	ㅧ	ㅨ	ㄹ	ㅀ	ㅥ	ㅁ	ㅱ	ㅂ	ㅸ	ㅹ

Final

U+11Ax			□	□	□	□	□	ㄱ	ㄲ	ㄳ	ㄴ	ㄵ	ㄶ	ㄷ	ㄹ
U+11Bx	ㄺ	ㄻ	ㄼ	ㄽ	ㄾ	ㄿ	ㅀ	ㅁ	ㅂ	ㅄ	ㅅ	ㅆ	ㅇ	ㅈ	ㅊ	ㅋ
U+11Cx	ㅌ	ㅍ	ㅎ	ㄳ	ㅺ	ㅥ	ㅦ	ㅧ	ㅨ	ㅌ	ㅁ	ㅂ	ㅄ	ㅿ	ㅿ	ㆆ

*) New consonants (Alphabetic consonants) for this project: <Chart 1>.

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The new consonants have to be classified into its roles for the initial, the final or for the both.

 - The consonants of "V-Z-ㅍ (substitute for F) – ㄷㅎ-ᄮ (substitute for TH)" will be used only for the initial, because it is very rare being used for syllabic closure. Any syllables being used those consonants for the final (syllabic closure), then it will be written in the "joining the syllables".

- The "R" will be used for both the initial and the final (base).

- The "R ㄴ, R ㄹ, R ㅁ, R ㅋ, R ㅌ, R ㅍ" will be used only for the final (base).

< Chart 1 >: The initial consonants: Line 00x0 to Line 00x4 (5 characters).
            The final consonants: Line 00x5 to Line 00xB (7 characters).

12. New Syllables for the Project:
  < Chart 2: Alpha-Hangul syllables>.

New syllables will be used to express the additional expressions that are limited by the current Hangul Unicode. The new and existing components can be used to combine into these new syllables. The syllables will be corresponding with the phonetic sound of the foreign loan words. It will be written in joining syllables for any expressions that does not match with those new syllables.

The vowels in Hangul are also called the medial that means the center sound of the syllable.

*The first group of the syllables in line 1 to 101 are used the 8 medial [vowels; ㅏ ㅓ ㅣ ㅗ ㅜ ㅡ ㅐ ㅔ] to indicate English vowel sound.

*The second group in line 102 to 125 are used the 6 medial [vowels:ㅗ ㅑ ㅛ ㅕ ㅠ ㅖ] from Unicode chart that are not utilizing currently:
 * Lines 1–51: New initial consonant Syllables.
The combination of 6 initial, 8 medial and 16 final consonants are in this group. The 16 base consonants are the minimum corresponding phonetic sound for English words. Any words that don't have the matching syllables, then, it will be written in joining syllables. [fog; 포그 or 포ㄱ, path; 패ᄯ]
The number for this group is 6x8x(1+16)=816 characters

 *Lines 52–59: Syllables with the final "R".
128 Unicode syllables matched with final "R".

 *Lines 60–101: Syllables with the new final consonants.
112 Unicode syllables matched with 6 new combination final [R ㄴ, R ㄹ R ㅁ R ㅋ R ㅌ R ㅍ].

*Lines 102–115: Extended Syllables with existing Unicode vowels [ㅗ ㅐ ㅛ ㅕ ㅠ ㅔ] .

13. Characters names: Alphabetic consonant names in <Chart 1>
          :Alpha-Hangul syllable names in <Chart 2>

##). Appeal

As history would tell us, Koreans have used Chinese characters. As a result, a lot of Korean vocabularies are from Chinese characters. Even though Hangul was invented about 600 years ago, some Koreans are still using Chinese characters mixed with Hangul on regular basis. This is because, they want to indicate the Chinese origin words in Chinese characters, in order to avoid confusion or ambiguity. Similarly, the Japanese are mixing their characters with the Chinese characters.
With a long history in use of Alphabet, it has been spread globally. From there, it has been modified slowly and came evolution of such along with the user and usage. Especially in some cases like Russian, the modification of alphabet must be invented by the known or unknown individual or small group of people.
This project is borrowing some alphabet characters and re-characterizing them into Hangul, and then mixing them with Hangul altogether. The mixing Hangul and Alphabet together could be seen controversial, but this is only for expressing foreign loan words. Nevertheless, the people will have the option to use these new characters, to avoid confusion or ambiguity.
The borrowing some foreign character and mixing them with Hangul is not an unaccustomed Korean practice. Actually, you do already see captions that are mixed with Hangul and Alphabet on Korean TV programs time to time (see images on page 8, below). Further proof, English loan words are more widely used than ever before, and the demands for accurate expressions are increasing greatly. Please do deeply consider the positive need for the modern IT era.

Images: