

## Any Language Input System

BY

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5

BACKGROUND OF THE INVENTION

The present invention relates to any language input system to input Hangul or any other language characters using a keypad or a keyboard for improving typing speed and efficiency and relieving finger fatigue during manual data input operation. More particularly, this invention relates to any language input system using a keypad or a keyboard comprising a first group of seven keys for inputting a consonant by pressing a single key or simultaneously pressing a combination of keys thereof, and a second group of seven keys for inputting a vowel by pressing a single key or simultaneously pressing a combination of keys thereof.

Hangul is a phonemic alphabet for the Korean language organized into syllabic blocks. Each block, making up a syllable, consists of an initial consonant letter (Choseong) and a medial vowel letter (Jungseong) with or without a trailing consonant letter (Jongseong).

There are 24 simple consonant and vowel letters, equivalent to letters of the Latin alphabet, of which 14

are simple consonant letters and the rest 10 are simple vowel letters as in FIG. 2. 27 additional letters were made by clustering two or sometimes three of the simple consonant or vowel letters, of which 16 are consonant clusters and 11 are diphthongs. Among the 16 consonant clusters, five double consonant letters were made by glottalizing five simple consonant letters. Thus, total of 51 letters, called Jamo, are the units, making up the Hangul alphabet, for the initial consonant letters, medial vowel letters and trailing consonant letters. Among the 30 consonant letters, only 19 and 27 are used respectively as an initial consonant letter and a trailing consonant letter. All 21 vowel letters are used as a medial vowel, however. Therefore, the total number of possible Hangul syllables is 11,172 ( $=19 \times 27 \times 21$ ).

FIGS. 4(a)~(f) describe how to form a syllable by combining an initial consonant letter and a medial vowel letter with or without a trailing consonant letter. Hangul automaton algorithms have been developed to process a series of keyboard or keypad strokes into letters comprising syllables and a sentence.

Traditionally, all Hangul input systems have been developed based on the assumption that an initial consonant letter, a medial vowel letter and a trailing consonant

letter, if any, must be sequentially typed to input one syllable, just like the Alphabet keyboard input system even if some keystrokes can be typed together. Especially, an initial consonant letter and a medial vowel letter do not  
5 have to be typed sequentially because even if they are typed together, they can be recognized as one initial consonant letter and another medial vowel letter. Despite this point to improve typing speed, all conventional Hangul input systems were developed to sequentially type a  
10 consonant letter for an initial consonant letter, a vowel letter for a medial vowel and a consonant letter, if any, for a trailing consonant letter and then move onto next syllable.

There are two types of Hangul keyboard input system -  
15 a two set system and a three set system. In a two set system, consonant and vowel letters are arranged respectively on the left and right side of a keyboard and a user sequentially types a consonant letter and a vowel letter for inputting a syllable. In a three set system,  
20 letters for initial consonant letters, medial vowel letters and trailing consonant letters are respectively arranged on the left, middle and right side of a keyboard and a user sequentially types an initial consonant letter, a medial vowel letter and a trailing consonant letter, if any. In

both kinds of input systems, some compound consonant or vowel letters are input by sequentially typing two consonant or vowel letters on the keyboard.

Another major type of Hangul input system has been developed as a reduced keyboard or keypad for electronic devices such as cellular phones or PDAs. Due to their small size, there has been demand for a Hangul system having small number of keys. A cellular phone generally has 12 keys - 10 digits, # and \*, and accordingly, a number of Hangul input systems have been developed to accommodate the limited number of keys on a cell phone. The keys on a cellular phone have minimal number of essential Jamo letters and all other Jamo are entered by pressing a couple of essential Jamo letters. However, all Hangul input systems have adopted the method of sequential typing of a couple of keys and thus, entry of a single symbol requires many keystrokes and makes text input slow and tedious and the use of reduced keyboard very inconvenient.

For instance, Chun-Ji-In system was developed to input all vowel letters by using only three keys of ".", "-", and "|". Under the system, "ㅏ" is input by sequentially pressing ".", "-", "l" and ".". However, this system is

very slow and tedious because for example, it requires five sequential keystrokes to input "계" or "내".

Accordingly, a need for any language input system to input Hangul or any other language characters from a keypad  
5 or a keyboard for improving typing speed and efficiency and relieving finger fatigue during manual data input operation has been present for a long time considering the expansive demands in the everyday life. This invention is directed to solve these problems and satisfy the long-felt need.

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#### SUMMARY OF THE INVENTION

The present invention contrives to solve the disadvantages of the prior art.

An object of the invention is to provide any language  
15 input system to input Hangul or any other language characters from a keypad or a keyboard for improving typing speed and efficiency and relieving finger fatigue during manual data input operation.

Another object of the invention is to provide any  
20 language input system using a keypad or a keyboard comprising a first group of keys comprising seven key faces for inputting a consonant by pressing a single key or a combination of keys thereof, and a second group of keys

comprising seven key faces for inputting a vowel by pressing a single key or a combination of keys thereof.

Still another object of the invention is to provide Any language input system using a computer-implemented  
 5 keypad or keyboard comprising a first group of keys for inputting a consonant by pressing a single key or simultaneously pressing a combination of keys thereof, and a second group of keys for inputting a vowel by pressing a single key or simultaneously pressing a combination of keys  
 10 thereof, wherein the first group of keys consists essentially of seven keys and is arranged on a first matrix of three rows and three columns, and the second group of keys consists essentially of seven keys and is arranged on a second matrix of three rows and three columns.

15 An aspect of the invention provides any language input system wherein the first group of keys comprises seven current or archaic Korean letters of "□", "·", "○", "入", "一", "ㄱ", and "ㄴ" and the second group of keys comprises seven current or archaic Korean letters of "ㅏ", "ㅑ", "ㅓ", "ㅕ", "ㅗ", "ㅛ", "ㅜ", and "ㅠ"; and each group of seven keys is  
 20 arranged on a matrix of three rows and three columns.

The advantages of the present invention are: (1) any language input system to input Hangul or any other language

characters from a keypad or a keyboard for improving typing speed and efficiency and relieving finger fatigue during manual data input operation; (2) any language input system has only 14 letters - 7 for consonants and 7 for vowels so  
5 that the system can be accommodated in a small keypad without compromising typing speed; and (3) the key layout and simultaneous typing of multiple keys in any language input system can improve typing speed and convenience of its use.

10 Although the present invention is briefly summarized, the fuller understanding of the invention can be obtained by the following drawings, detailed description and appended claims.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

These and other features, aspects and advantages of the present invention will become better understood with reference to the accompanying drawings, wherein:

FIG. 1 is a diagram for any language input system  
20 showing first group of seven consonant keys and second group of seven vowel keys;

FIG. 2 shows the types of consonant and vowel letters of Hangul;

FIG. 3 shows consonant and vowel letters for an initial consonant letter, a medial vowel letter and a trailing consonant letter;

FIGS. 4(a)~(f) show the types of placement of an initial consonant letter, a medial vowel letter and a trailing consonant letter;

FIG. 5 is a diagram for another embodiment of any language input system having a toggle key;

FIG. 6 is a diagram for yet another embodiment of any language input system having a trailing consonant key;

FIG. 7 is a diagram for yet another embodiment of any language input system showing first, second, and third groups of keys; and

FIG. 8 is a diagram for yet another embodiment for Chinese language input system;

**DETAILED DESCRIPTION EMBODIMENTS OF THE INVENTION**

FIG. 2 shows the types of consonant and vowel letters in Hangul. There are 24 simple consonant and vowel letters, equivalent to letters of the Latin alphabet, of which 14 are simple consonant letters and the rest 10 are simple vowel letters. Additional 16 compound consonant letters were made by clustering two simple consonant letters and additional 11 compound vowel letters were made by

clustering two or three simple vowel letters including an archaic simple vowel letter, ".". Even if "." is currently not used, it still has very important function in creating many of the compound vowel letters. For instance, "ㅑ"

5 consists of "-", ".", and "l".

In fact, all vowel letters can be dissected into a combination of ".", "-" and "l". For instance, "ㅑ" consists of ".", "-", and "l". As described above, Chun-Ji-In system uses these three elements to input vowel letters, but its typing is very slow and tedious because it requires many keystrokes to input a vowel letter; for instance, "ㅑ" and "ㅓ" require five sequential keystrokes.

One Hangul syllable consists of an initial consonant letter, a medial vowel letter and a trailing consonant letter, if any. Trailing consonant is called final consonant as well. As shown in FIG. 3, only 19 and 27 from the 30 consonant letters are respectively used as an initial consonant letter and a trailing consonant letter.

FIGS. 4(a)~(f) show the types of placement of the three elements. The syllables of FIGS. 4(a)~(f) transliterate to "ga", "gal", "nu", "neud", "dui" and "wid", respectively. Even if all 27 vowel letters are used as a

medial vowel letter, not all consonant letters are used as an initial consonant letter or a trailing consonant letter.

FIG. 1 shows any language input system using a computer-implemented keypad or keyboard comprising a first group of keys for inputting a consonant by pressing a single key or simultaneously pressing a combination of keys thereof; and a second group of keys for inputting a vowel by pressing a single key or simultaneously pressing a combination of keys thereof; wherein the first group of keys consists essentially of seven keys and is arranged on a first matrix of three rows and three columns, and the second group of keys consists essentially of seven keys and is arranged on a second matrix of three rows and three columns. The first group of keys consists essentially of five Hangul simple consonant letters and two function keys: the five Hangul simple consonant letters of "ㄱ", "ㅇ", "ㄴ", "ㄷ", and "ㄹ", and the two function keys are "." and "-". The second group of keys consists essentially of six Hangul simple vowel letters and one Hangul archaic vowel letter: "ㅏ", "ㅑ", "ㅓ", "ㅕ", "ㅗ", "ㅛ" and "ㅜ".

A Hangul syllable consists of an initial consonant letter, a medial vowel letter, and a trailing consonant letter, if any. A syllable can be entered by inputting an

initial consonant letter, a medial vowel letter, and a trailing consonant letter, if any, by using the first group of keys for the initial consonant, the second group of keys for the medial vowel, and the first group of keys for the trailing consonant. One or a combination of keys on the first group of keys are simultaneously pressed for an initial consonant letter or a trailing consonant letter, and one or a combination of keys on the second group of keys are simultaneously pressed for a medial vowel letter.

10 An initial consonant letter and a medial vowel letter may be simultaneously pressed because sequential typing is not necessary. Unlike English alphabet or Latin characters, Hangul does not have to be input sequentially. Consonant and vowel letters of Hangul are separated on a keyboard or keypad and even if they are typed together, the input system or a computer can recognize them as separate and combine them to form a syllable. Only the trailing consonant needs to be typed separately. By simultaneously typing an initial consonant letter and a medial vowel letter, typing speed can become a lot faster.

The consonant letters fall into five homorganic groups, each with a basic shape, and one or more letters derived from this shape by means of additional strokes. The five homorganic groups are as follows:

(1) Velar consonants (molar sounds): basic shape of "ㄱ",  
and "ㅋ" and "ㆁ";

(2) Coronal consonants (lingual sounds): basic shape of "ㄴ",  
and "ㄷ", "ㅌ", "ㄹ", and "ㄷㄹ";

5 (3) Bilabial consonants (labial sounds): basic shape of "ㅍ",  
and "ㅂ", "ㅃ", and "ㅄ";

(4) Sibilant consonants (dental sounds): basic shape of "ㄷ",  
and "ㅌ", "ㄸ", "ㅍ", and "ㅆ"; and

(5) Glottal consonants (throat sounds): basic shape of "ㅇ",  
10 and "ㅎ".

Therefore, the seven key faces for inputting a  
consonant are the five basic shapes of "ㄱ", "ㄴ", "ㅍ", "ㄷ",  
and "ㅇ", and two function keys of "." and "-", wherein  
"." and "-" are keys to make other consonants from the  
15 basic shapes of "ㄱ", "ㄴ", "ㅍ", "ㄷ", and "ㅇ".

Preferably, these seven key faces are placed on a 3x3  
matrix wherein "." and "-" occupy the center because they  
are frequently used.

Thus, the following simultaneous keystrokes for  
20 consonants were made:

(1) Molar sounds

ㄱ(g)="ㄱ",      ㅋ(k)="ㄱ"+"ㅡ",      ㆁ(gg)="ㄱ"+"ㅇ";

(2) Lingual sounds

ㄴ(n)="ㄴ",      ㄷ(d)="ㄴ"+"ㅡ",      ㄷㅌ(t)="ㄴ"+"ㅡ"+".",

ㄷㄷ(dd)="ㄴ"+"ㅡ"+"ㅇ",      ㄷㅌㅇ(tho)="ㄴ"+"ㅡ"+"."+"ㅇ",

5 ㄹ(l)="ㄱ"+"ㅡ"+"ㄴ",      ㄹㅇ(rlo)="ㄱ"+"ㅡ"+"ㄴ"+"ㅇ";

(3) Labial sounds

ㅁ(m)="ㅁ",      ㅂ(b)="ㅁ"+"ㅡ",      ㅂㅍ(p)="ㅁ"+"ㅡ"+".",

ㅂㅂ(bb)="ㅁ"+"ㅡ"+"ㅅ",      ㅂㅍㅇ(fo)="ㅁ"+"ㅡ"+"."+"ㅇ",

ㅂㅇ(vbo)="ㅁ"+"ㅡ"+"ㅇ";

10 (4) Dental sounds

ㅅ(s)="ㅅ",      ㅆ(j)="ㅅ"+"ㅡ",      ㅆㅆ(jj, z)="ㅅ"+"ㄴ"+"ㅡ",

ㅆㅅ(sc)="ㅅ"+"ㅡ"+".",      ㅅㅇ(sho)="ㅅ"+"ㅇ",

ㅆㅇ(zho)="ㅅ"+"ㅡ"+"ㅇ",      ㅆㅅㅇ(chso)="ㅅ"+"ㅡ"+"."+"ㅇ",

ㅆㅅ(ss)="ㅅ"+"ㄴ"; and

15 (5) Throat sounds

ㅇ(ng)="ㅇ",      ㅎ(h)="ㅇ"+"ㅡ"+".".

For vowel letters, the seven key faces consist of "ㅏ",  
 "ㅑ", "ㅓ", "ㅕ", "ㅡ", "ㅣ", and "ㅛ". Under Chun-Ji-In  
 system, "ㅛ", "ㅡ" and "ㅣ" keys must be sequentially pressed,  
 20 but under the system of the present invention, simultaneous  
 pressing is possible for all 21 vowel letters as follows:

ㅏ(a)="ㅏ",                    ㅑ(ae)="ㅏ"+"ㅑ",            ㅓ(ya)="ㅏ"+"ㅓ",  
 ㅕ(yae)="ㅏ"+"ㅕ",            ㅗ(eo)="ㅗ",            ㅛ(e)="ㅗ"+"ㅛ",  
 ㅜ(yeo)="ㅗ"+"ㅜ",           ㅝ(ye)="ㅗ"+"ㅝ",           ㅞ(o)="ㅞ",  
 ㅟ(wa)="ㅞ"+"ㅟ",           ㅠ(wae)="ㅞ"+"ㅠ",  
 5 ㅡ(oe)="ㅞ"+"ㅡ",           ㅢ(yo)="ㅞ"+"ㅢ",           ㅣ(u)="ㅣ",  
 ㅤ(wo)="ㅣ"+"ㅤ",           ㅥ(we)="ㅣ"+"ㅥ",  
 ㅦ(wi)="ㅣ"+"ㅦ",           ㅧ(yu)="ㅣ"+"ㅧ",           ㅨ(eu)="ㅨ",  
 ㅩ(ui)="ㅨ"+"ㅩ",           ㅪ(i)="ㅪ"

The above 21 combinations are all different and thus,  
 10 even if keys are simultaneously pressed, the input system  
 can be programmed to recognize a vowel letter for a certain  
 combination.

Hangul is known for its capability to represent as  
 many as 11,172 sounds and languages other than Korean  
 15 consist of syllables as well. Thus, the input system of the  
 present invention can be used for inputting other languages  
 and the typing is a lot faster. For example, "SCHOOL" is  
 "SCHOOL" in English which transliterate to "스쿨" in Korean,  
 "학교" in Korean, "學校" in Chinese which transliterates to  
 20 "체쇼" in Korean, "學校" in Japanese which transliterates to  
 "갓쿄" in Korean, "SCHULE" in German which transliterates to  
 "슈레" in Korean, and "ESCUELA" in Spanish which

transliterates to "에스퀘라". "SCHOOL" in English requires five strokes, but using the input system of the present invention, three strokes are enough: the first for "스", the second for "쿠" and the third for "르". "SCHOOL" in Chinese and Japanese requires only two and three strokes, respectively. "SCHULE" in German and "ESCUELA" in Spanish require six and seven strokes, respectively, but using the input system, respectively two and four strokes are enough.

FIG. 5 is a diagram for another embodiment of any language input system having a toggle key (V). The toggle key is to be pressed for using the second group of seven key faces. The input system comprises seven keys each of which has two key faces, one of which is from the first group of seven key faces and the other of which is from the second group of seven key faces. To input a vowel letter, the toggle key has to be pressed.

FIG. 6 is a diagram for yet another embodiment of any language input system having a trailing consonant key. The trailing consonant key is arranged on the second matrix of three rows and three columns for inputting a trailing consonant and pressed to input a trailing consonant using the first group of seven keys.

FIG. 7 is a diagram for yet another embodiment of any language input system showing first, second, and third groups of keys. Here, the input system comprises a first group of keys for inputting a consonant by pressing a single key or simultaneously pressing a combination of keys thereof; a second group of keys for inputting a vowel by pressing a single key or simultaneously pressing a combination of keys thereof; and a third group of keys for inputting a trailing consonant by pressing a single key or simultaneously pressing a combination of keys thereof; wherein the first group of keys consists essentially of seven keys and is arranged on a first matrix of three rows and three columns, the second group of keys consists essentially of seven keys and is arranged on a second matrix of three rows and three columns, and the third group of keys consists of seven keys and is arranged on a third matrix of three rows and three columns.

FIG. 8 is a diagram for yet another embodiment for Chinese language input system. The system comprises a first group of keys for inputting a consonant by pressing a single key or simultaneously pressing a combination of keys thereof; and a second group of keys for inputting a vowel by pressing a single key or simultaneously pressing a combination of keys thereof; wherein the first group of

keys consists of seven keys and is arranged on a first matrix of three rows and three columns, and the second group of keys consists of nine keys and is arranged on a second matrix of three rows and three columns; wherein the first group of keys consists of "m", ". ", "o", "s", "—", "g", and "n"; and wherein the second group of keys consists of "e", ". ", "u", "a", "i", "o", "ng", "er", and "n".

The following simultaneous keystrokes of consonants for Chinese were made:

(1) Molar sounds

$g=(g)$ ,  $k=(g)+(-)$

(2) Lingual sounds

$d=(n)+(-)$ ,  $t=(m)+(-)+(\cdot)$ ,  $n=(n)$ ,  $l=(n)+(-)+g$ ,

$r=(n)(-)+g+o$ ,

(3) Labial sounds

$B=(m)+(-)$ ,  $p=(m)+(-)+(\cdot)$ ,  $m=(m)$ ,  $f=(m)+(-)+(\cdot)+(\circ)$

(4) Dental sounds

$J=(s)+(-)$ ,  $q=(s)+(-)+(\cdot)$ ,  $x=(s)$ ,  $zh=(s)+(-)+(\circ)$ ,

$Ch=(s)+(-)+(\cdot)+(\circ)$ ,  $sh=(s)+(\circ)$ ,  $c=(s)+(-)+(\cdot)$ ,

$S=(s)$ ; and

(5) Throat sounds

$H=(\circ)+(-)+(\cdot)$ ,  $hm=(\circ)+(-)+(\cdot)(m)$

For vowels, the following keystrokes were made:

a=(a), o=(o), e=(e), i=(i), u=(u), U=(ui),  
 ai=(a)(i), ei=(a+i)(i), ui=(u)(i), ui=(u)(i),  
 ou=(o)(u), iu=(i)+(u), ie=(i)(a+i), Ue=(u)(ai)  
 5 er=(e)(er), an=(a)+(n), en=(e)+(n), in=(i)+(n)  
 un=(u)+(n), Un=(u)+(i)(n), ang=(a)+(ng), ing=(i)+(ng),  
 ong=(o)+(ng), ia=(a)+(·), ian=(a)+(·)+(n),  
 iao=(a)+(·)(o), iang=(a)+(·)+(ng), iu=(u)+(·),  
 ua=(u)+(a), uai=(u)+(a)(i), uan=(u)+(a)+(ng),  
 10 uong=(u)+(e)+(ng), uo=(u)+(e), y=(i),  
 yong=(o)+(·)+(ng), you=(o)+(·)(u), yuon=(o)+(i)+(n)  
 wei=(o)+(i)(i). Here, capital U is u with umlaut (2 dots on  
 the top).

While the invention has been shown and described with  
 15 reference to different embodiments thereof, it will be  
 appreciated by those skilled in the art that variations in  
 form, detail, compositions and operation may be made  
 without departing from the spirit and scope of the  
 invention as defined by the accompanying claims.

**ABSTRACT**

This invention relates to any language input system using a keypad or a keyboard comprising a first group of seven keys for inputting a consonant by pressing a single  
5 key or simultaneously pressing a combination of keys thereof, and a second group of seven keys for inputting a vowel by pressing a single key or simultaneously pressing a combination of keys thereof, wherein the first group of seven keys are "□", "○", "△", "∩", "∪", "·" and "—",  
10 and the second group of seven keys are "∩", "∪", "∩", "∪", "∩", "∪", and "·". The advantages of the present invention are improving typing speed and efficiency by using only 14 key faces and relieving finger fatigue during manual data input operation.

15

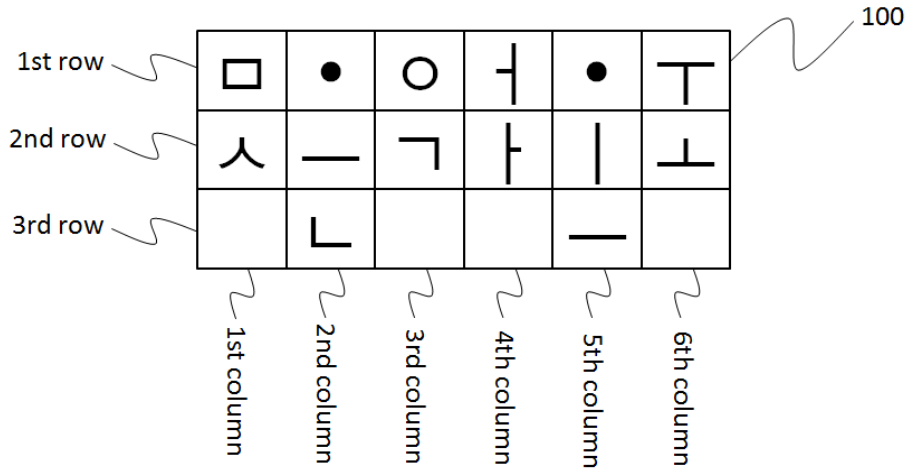


FIG. 1

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Korean Hangul Alphabets

Simple Consonant Letters	ㄱ, ㄴ, ㄷ, ㄹ, ㅁ, ㅂ, ㅅ, ㅇ, ㅈ, ㅊ, ㅋ, ㆁ, ㆁ, ㆁ
Double Consonant Letters	ㄲ, ㄸ, ㅃ, ㅆ, ㅉ
Consonant Clusters	ㄱㄴ, ㄷㄹ, ㅂㅅ, ㅅㅈ, ㄱㄴ, ㄴㅇ, ㄹㅇ, ㄹㅁ, ㄹㅂ, ㄹㅅ, ㄹㅇ, ㄹㅁ, ㄹㅂ, ㄹㅅ, ㄹㅇ
Simple Vowel Letters	ㅏ, ㅑ, ㅓ, ㅕ, ㅗ, ㅛ, ㅜ, ㅠ, ㅡ, ㅣ
Diphthongs	ㅑ, ㅓ, ㅕ, ㅗ, ㅛ, ㅜ, ㅠ, ㅡ, ㅣ

FIG. 2



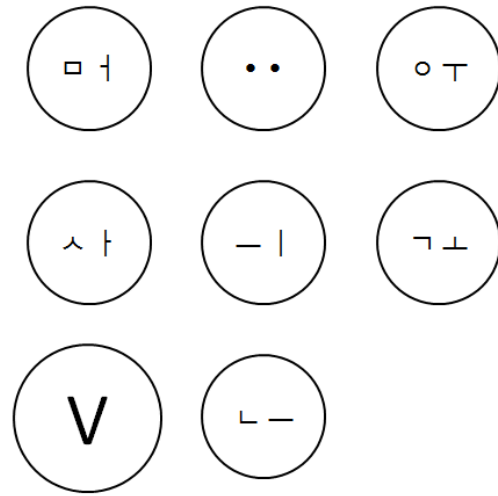


FIG. 5

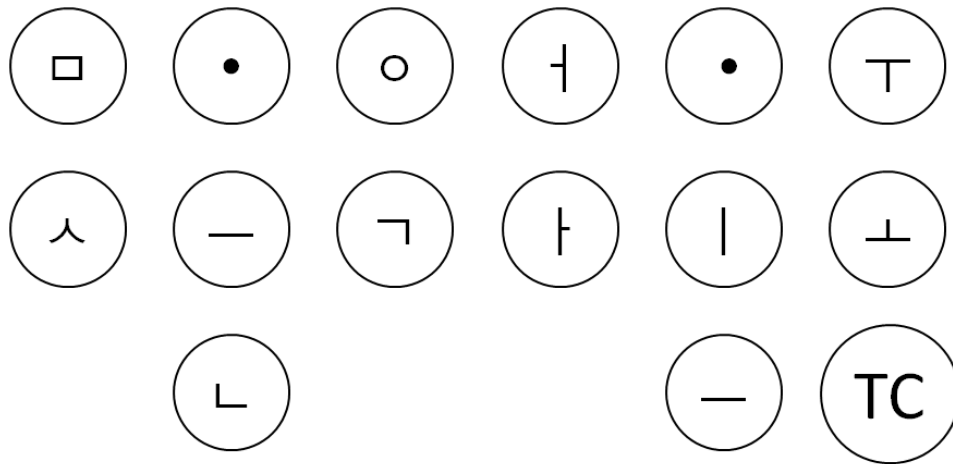
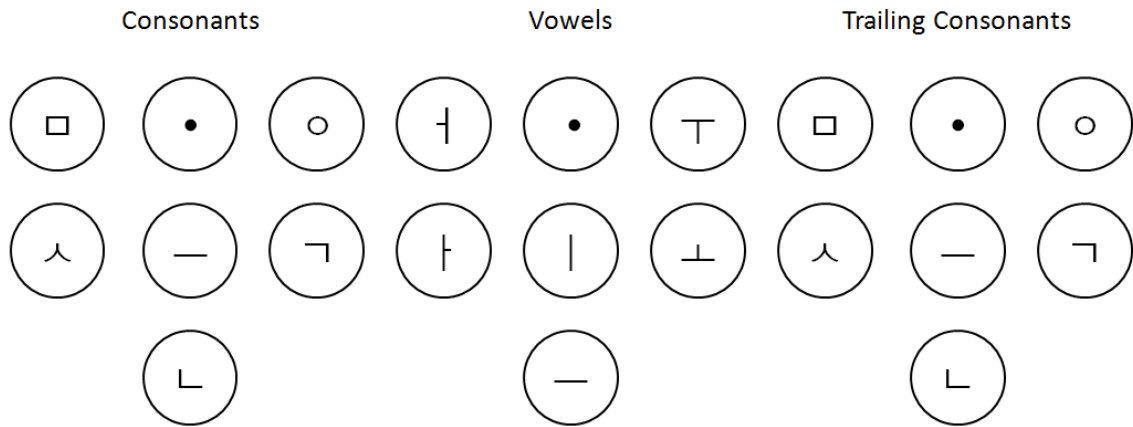
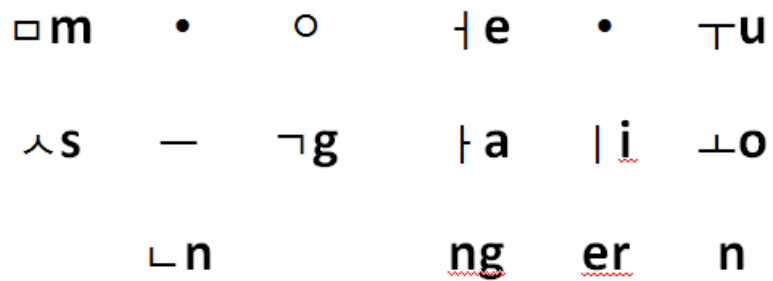


FIG. 6



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FIG. 7



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FIG. 8