

libhandwriting Overview

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1 Library Overview

Purpose and Features

libhandwriting is a library that provides handwriting recognition functions. It returns the recognition result based on the given handwriting input information.

Arbitrary handwriting operations can be made to be recognized through the use of a character registration function.

Files

The files required for using libhandwriting are as follows.

Filename	Description
libhandwriting.h	Header file
libSceHandwriting_stub.a	Stub library file
libSceHandwriting_stub_weak.a	weak import stub library file

Sample Programs

Sample programs for libhandwriting are as follows.

`samples/sample_code/engines/api_libhandwriting/`

This is the basic sample program using libhandwriting.

RegisterDicEditor

This is a tool program for creating registered dictionaries for libhandwriting. For details, refer to the help file.

RegisterDicEditor is located at:

- `%SCE_PSP2_SDK_DIR%/host_tools/handwriting/`

2 Using the Library

Basic Procedure

This section explains the basic procedure for calling libhandwriting. The following is the processing flow.

- (1) Load the libhandwriting module
- (2) Call `sceHandwritingGetBufferSize()` and `sceHandwritingInit()` to perform initialization
- (3) Call `sceHandwritingRecognize()` to perform recognition processing
- (4) Call `sceHandwritingTerm()` to perform termination
- (5) Repeat steps (2) to (4), as needed.
- (6) Unload the libhandwriting module.

Procedure for Calling libhandwriting

(1) Load the module

The libhandwriting module is loaded with the API of libsysmodule. Specify `SCE_SYSMODULE_HANDWRITING` and call `sceSysmoduleLoadModule()`.

(2) Initialization

Obtain and allocate the memory size required for the dictionary used by `sceHandwritingGetBufferSize()`. Then, pass the allocated memory to `sceHandwritingInit()`. To use the character registration function, proceed on to call `sceHandwritingRegisterInit()`.

(3) Recognition processing

Obtain the result by passing the handwriting data to `sceHandwritingRecognize()`. To obtain the results in the character registration function, proceed on to call `sceHandwritingRegisterGetResult()`.

(4) Termination

To not go on to perform recognition processing, call `sceHandwritingTerm()` to end the processing. If the character registration function was being used, call `sceHandwritingRegisterTerm()` before calling `sceHandwritingTerm()`.

(5) Unload the module

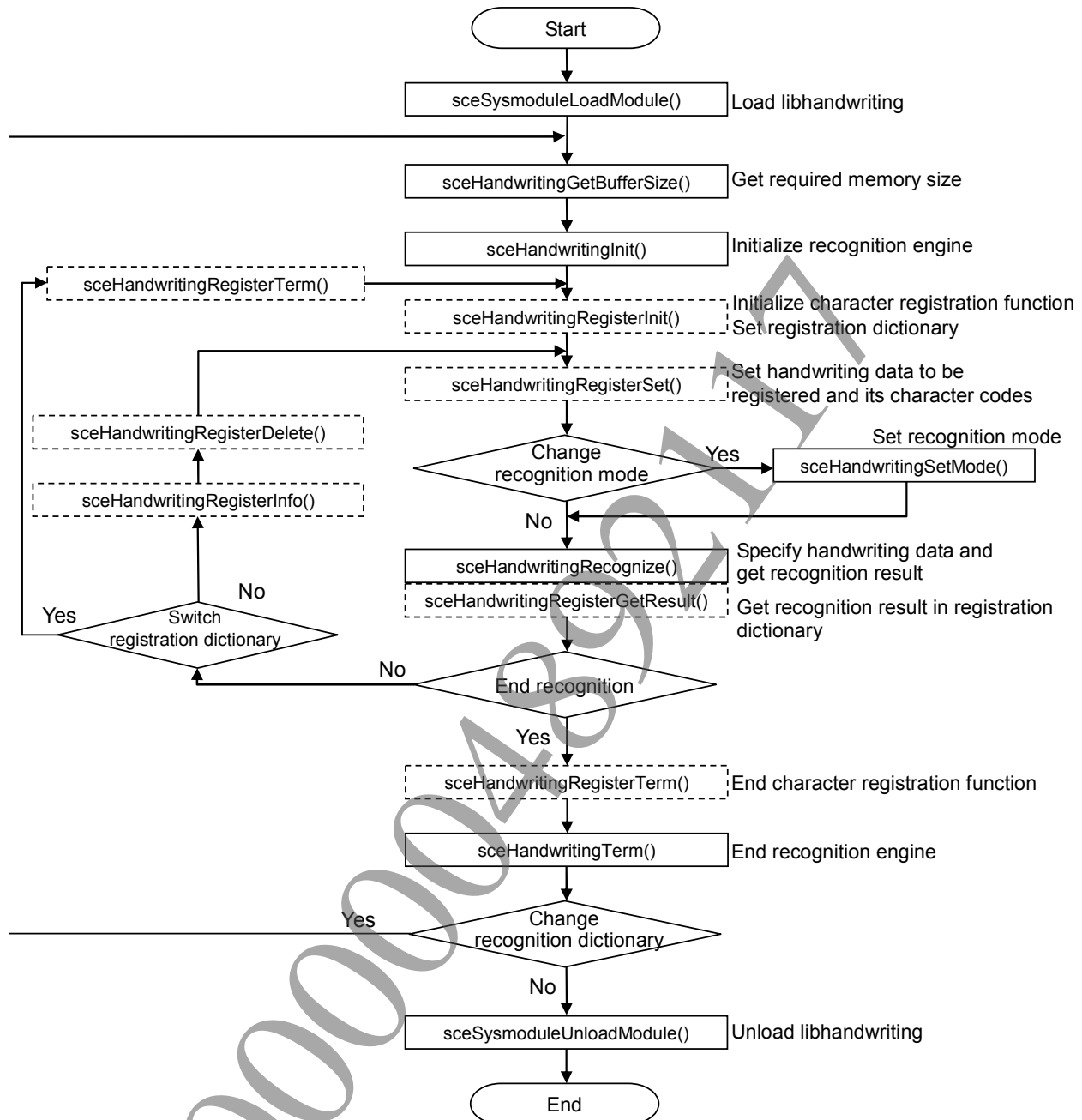
When the recognition function is no longer necessary, specify `SCE_SYSMODULE_HANDWRITING` and call `sceSysmoduleUnloadModule()`.

Main APIs Used in Basic Processes

API	Description
<code>sceHandwritingGetBufferSize()</code>	Obtains the required buffer size
<code>sceHandwritingInit()</code>	Initializes libhandwriting
<code>sceHandwritingRecognize()</code>	Obtains the recognition result based on the handwriting data
<code>sceHandwritingTerm()</code>	Terminates libhandwriting
<code>sceHandwritingSetMode()</code>	Sets the recognition mode

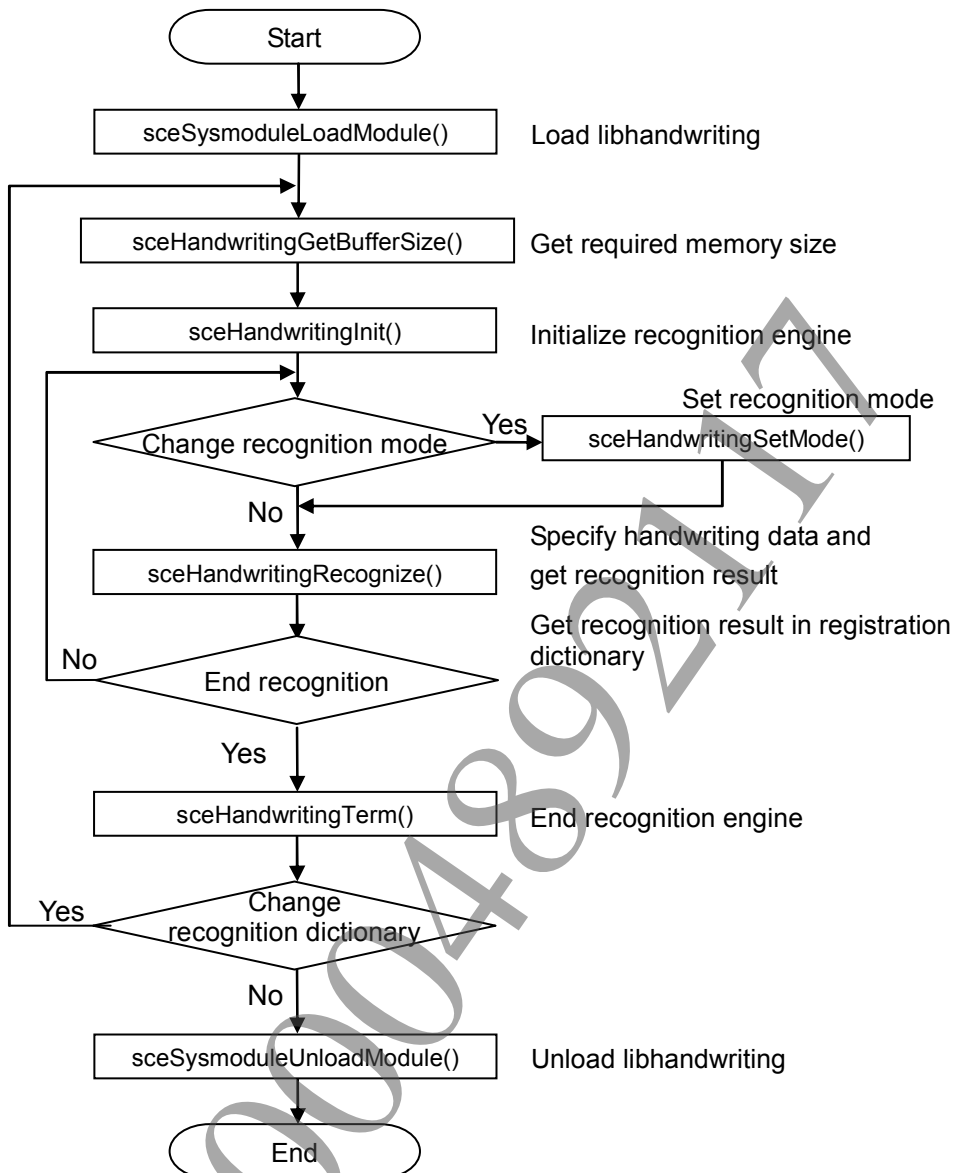
The sequence diagram when the character registration function is used is shown below.

Figure 1 Sequence Diagram (When Character Registration Function Is Used)



The sequence diagram when the character registration function is not used is shown below.

Figure 2 Sequence Diagram (When Character Registration Function Is Not Used)



3 Detailed Specifications

Available Dictionaries

The dictionaries that can be used for libhandwriting are listed below. For details on the characters targeted for recognition, refer to the "Recognition Target Characters" section.

Dictionary	Recognizable Character Set
Alphanumeric characters	English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Alphanumeric characters (westernized)	English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Hiragana	Hiragana: 83 characters Symbols: 9 characters (、 。 ? ! - 「 」 °)
Katakana	Katakana: 86 characters Symbols: 9 characters (、 。 ? ! - 「 」 °)
Kanji	JIS 1st level: 2965 characters JIS 2nd level: 776 characters Symbols: 3 characters (全 々 〆)
Kanji 2	JIS 1st level: 2965 characters JIS 2nd level: 3390 characters Symbols: 3 characters (全 々 〆)
All character types (Japan)	English characters: 52 characters Numeric characters: 10 characters Symbols: 103 characters Greek characters: 35 characters Hiragana: 83 characters Katakana: 86 characters JIS 1st level: 2965 characters JIS 2nd level: 776 characters
All character types (Japan) 2	English characters: 52 characters Numeric characters: 10 characters Symbols: 103 characters Greek characters: 35 characters Hiragana: 83 characters Katakana: 86 characters JIS 1st level: 2965 characters JIS 2nd level: 3390 characters
Latin 1	Latin: 67 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 9 characters (, . ' " - ! ? ¡ ò)
Korea	Hangul: 2350 characters Hanja: 4888 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Hangul	Hangul: 2350 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)

Dictionary	Recognizable Character Set
Germany	Latin: 7 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Holland	Latin: 24 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
France	Latin: 30 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Italy	Latin: 14 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Spain	Latin: 14 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 9 characters (, . ' " - ! ? ¡ ÷)
Portugal	Latin: 26 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Russia	Cyrillic (Russia): 66 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Denmark, Norway	Latin: 6 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Sweden, Finland	Latin: 6 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?)
Iceland	Latin: 20 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?) * Includes the characters C, c, Q, q, W, w, Z, z, which are used to express loanwords and proper nouns.
Poland	Latin: 18 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 7 characters (, . ' " - ! ?) * Includes the characters Q, q, V, v, X, x, which are used to express loanwords
Simplified Chinese	Chinese characters: 6763 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 11 characters (, . ' " - ! ? 。 、 : ;)

Dictionary	Recognizable Character Set
Traditional Chinese	Chinese characters: 17561 characters English characters: 52 characters Numeric characters: 10 characters Symbols: 11 characters (, . ' " - ! ? 。 、 : ;)

Recognition Target Characters

English Characters: 52 Characters (26 Uppercase Characters, 26 Lowercase Characters)																									
A	B	C	D	E	F	F	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	
Z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	
y	z																								

Numeric Characters: 10 Characters									
0	1	2	3	4	5	6	7	8	9

Symbols: 103 Characters																									
、	。	，	．	・	：	；	？	！	°	′	″	′	″	′	″	′	″	′	″	′	″	′	″	′	″
—	-	/	\	~		‘	’	“	”	()	[]	{	}	<	>	《	》	「	」	『	』
」	『	』	【	】	+	-	±	×	÷	=	≠	≤	≥	∞	∴	♂	♀	°	′	″	℃	¥			
\$	¢	£	%	#	&	*	@	☆	★	○	●	◎	◇	◆	□	■	△	▲	▽	▼	※	〒	→	←	
↑	↓	#																							

* In the Korea dictionary, "全" belongs to Korean Hanja.

* In addition to the above characters, the Latin 1 dictionary and the Spain dictionary contain also the "ï" and "ü" characters.

Greek Characters: 35 Characters																									
α	β	γ	δ	ε	ζ	η	θ	ι	κ	λ	μ	ν	ξ	ο	π	ρ	σ	τ	υ	φ	χ	ψ	ω	Γ	
Δ	Θ	Λ	Ξ	Π	Σ	Υ	Φ	Ψ	Ω																

* Among the uppercase Greek characters, "A, B, E, Z, H, I, K, M, N, O, P, T, X" are output as the character code of the corresponding uppercase alphabetic character (Unicode UCS-4).

Hiragana: 83 Characters																									
あ	あ	い	い	う	う	え	え	お	お	か	が	き	ぎ	く	ぐ	け	げ	こ	ご	さ	ざ	し	じ	す	
ず	せ	ぜ	そ	ぞ	た	た	ち	ぢ	っ	つ	づ	て	で	と	ど	な	に	ぬ	ね	の	は	ば	ぱ	ひ	
び	ぴ	ふ	ぶ	ふ	へ	べ	ほ	ぼ	ぼ	ま	み	む	め	も	や	や	ゆ	ゆ	よ	よ	ら	り	る		
れ	ろ	わ	わ	ゐ	ゑ	を	ん																		

Katakana: 86 Characters																									
ア	アイ	ウ	エ	オ	カ	ガ	キ	ギ	ク	グ	ケ	ゲ	コ	ゴ	サ	ザ	シ	ジ	ス						
ズ	セ	ゼ	ソ	ゾ	タ	ダ	チ	ヂ	ッ	ツ	ヅ	テ	デ	ト	ド	ナ	ニ	ヌ	ネ	ノ	ハ	バ	パ	ヒ	
ビ	ピ	フ	ブ	フ	ヘ	ベ	ホ	ボ	マ	ミ	ム	メ	モ	ヤ	ヤ	ユ	ユ	ヨ	ヨ	ラ	リ	ル			
レ	ロ	ワ	ワ	ヰ	ヱ	ヲ	ン	ヴ	カ	ケ															

JIS 1st Level Kanji: 2965 Characters
(All of JIS 1st level Kanji)

(All of JIS 2nd level Kanji)

JIS 2nd Level: 776 Characters (Part of JIS 2nd Level Kanji)

式	丕	井	丿	豫	舒	式	于	亞	亟	一	亢	亶	从	仿	仟	价	佛	估	佰	侑	來	命	儘	倪	
俟	俎	俐	倅	倬	倨	假	會	偕	傅	僉	傳	僖	儔	儿	兀	兒	兌	兔	兩	俞	冂	冏	菁	乚	
彳	洌	凉	凜	几	鳳	刃	刎	刮	剋	劒	劓	辨	劭	劫	勁	勛	勗	勸	勵	勺	匄	甸	匍	匕	
匱	𠂇	卅	卉	準	卩	刎	卷	厂	厠	厥	厶	參	雙	叟	曼	咩	咻	咼	𡵈	咸	咨	品	哥	哮	
單	喻	嗅	嗜	嘴	嚴	囁	囧	囧	國	圓	坏	坏	坩	圪	垤	埤	塢	堡	埤	壘	壘	壘	壘	壯	
壺	壹	壽	夊	夊	夊	夭	夸	夾	奇	免	奎	奚	奢	獎	姜	甥	媚	嫩	子	孕	孚	孛	孰	學	
宀	它	寔	實	寶	將	對	尔	尸	尹	屏	巾	帛	岑	岫	岷	寫	峪	崗	寄	崔	岳	嶠	巍		
巖	巛	巳	帛	帛	帷	幟	幵	幺	广	廣	廩	廴	廹	廴	廴	廴	廴	廴	廴	廴	廴	廴	彭		
彳	從	忝	惠	怡	怎	忽	恣	恂	悍	惻	惠	悴	悴	惺	惺	愿	愼	愼	應	懋	懋	戋	戋	戊	
爻	扁	挾	掙	擲	攝	擴	攰	攰	攰	攰	攰	敝	敝	敝	敝	數	旁	旆	旆	旱	旱	昊	旻	昶	
昂	易	晏	眈	晉	晁	晝	晤	皓	晨	晟	哲	暎	暎	暎	暎	曉	曉	瞭	曠	眈	日	曳	肱	朧	
束	朶	杌	杠	杌	杌	杼	枌	枌	枌	枌	束	柩	柩	檜	檜	桀	桀	桀	桀	條	椰	樨	桴	楚	
栢	梧	棘	控	棧	棧	枷	棹	楨	櫛	櫛	互	股	榦	榦	毳	毳	榆	榮	槐	欒	槁	榧	樽	榴	
樂	權	縱	縻	縻	縻	櫃	櫟	櫻	歹	受	股	殼	母	毳	毫	毳	氣	氣	汪	沁	泓	泗	沮		
汨	洽	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸	洸		
澡	澤	澹	濤	濱	渚	炬	炳	焉	煥	煌	熨	熨	燧	燧	爭	爬	爲	爻	爻	犢	狄	貉	貉		
獮	猯	獮	玃	玃	珀	琥	珞	瑁	瑁	瑁	瑁	瓊	瓊	瓊	甦	甦	甦	甦	畫	畎	畎	疼	痒		
瘧	痰	瘤	癭	八	癸	皂	兒	皎	皖	皓	盍	盡	虛	眩	眞	眸	睿	睪	矣	矮	礪	礪	磊		
磧	礪	礪	祀	祠	祇	崇	祚	祓	祺	禧	齋	禮	禹	禺	拒	秋	秣	稊	稊	稊	穽	穽	穽		
穹	竈	笱	笱	笱	笱	筭	筭	筭	筭	筭	筭	筭	筭	筭	簞	簞	簞	簞	籐	籐	籐	籐	籐		
給	粳	粳	糲	糲	糲	紂	絲	經	綏	緇	總	緇	緇	緇	緇	縣	膝	繩	纈	纈	纈	纈	罐		
罔	毘	罽	羔	翔	耆	耿	聆	聚	聰	聶	肆	肆	冒	胥	胚	胖	眈	脰	脰	膀	膾	膾	膾		
臻	臾	與	舍	舩	舩	舩	艘	艸	芒	芎	苟	苟	苒	苞	茱	茲	茱	荅	茗	莖	莖	莖	莖		
莉	苙	菴	萱	葦	葦	范	萌	莢	蓀	蜀	蠶	蜃	蜻	蝮	螢	螂	蟆	蟠	蟠	莖	莖	莖	莖		
虺	屮	虔	蛆	蛤	蛭	蛇	蛇	蜃	諫																
禰	禰	襄	覺	觜	訛	詢	誅	諄	諫	諫	謨	謨	證	譽	豁	豈	豕	豕	豕	賤	賤	賤	賤		
跬	踞	躁	躬	躄	躄	躄	輻	輻	輻	輻	輻	輻	辟	辣	迪	邇	逵	逵	邁	邊	邊	邊	邊		
鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇	鈇		
閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏	閏		
頤	頤	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	顯	
鹹	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	鳴	
瑤																									

Latin (Latin 1): 67 Characters (33 Uppercase Characters, 34 Lowercase Characters)

À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	Ø	Ù
Ú	Û	Ü	Ý	Þ	ÿ	IJ	Œ	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï	ð
ñ	ò	ó	ô	õ	ö	ø	ù	ú	û	ü	ý	þ	ÿ	ij	œ	ß								

Cyrillic Characters (Russia): 66 Characters (33 Uppercase Characters, 33 Lowercase Characters)

А	Б	В	Г	Д	Е	Ё	Ж	З	И	Й	К	Л	М	Н	О	П	Р	С	Т	У	Ф	Х	Ц	Ч
Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я	а	б	в	г	д	е	ё	ж	з	и	й	к	л	м	н	о	п
р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я									

Hangul: 2350 Characters

(All KS X 1001 (KS C 5601) Hangul syllable characters)

Korean Hanja: 4888 Characters

(All KS X 1001 (KS C 5601) Hanja)

* The following duplicate Hanja characters (268 characters) among the Hanja characters belonging to KS X 1001 (KS C 5601) return the character code (Unicode UCS-4) of the Hanja characters included in the CJK unified ideographs.

豈	更	車	賈	滑	串	句	龜	龜	契	金	喇	奈	懶	癩	羅	蘿	螺	裸	邏	樂	洛	烙	珞	落
酪	駱	亂	卵	欄	爛	蘭	鸞	嵐	濫	藍	檻	拉	臘	蠟	廊	朗	浪	狼	郎	來	冷	勞	撈	櫓
爐	盧	老	蘆	虜	路	露	魯	鶯	碌	祿	綠	萊	錄	鹿	論	壟	弄	籠	聾	牢	磊	賂	雷	壘
屢	樓	淚	漏	累	縷	陋	勒	肋	凜	凌	稜	綾	菱	陵	讀	拏	樂	諾	丹	寧	怒	率	異	北
磻	便	復	不	泌	數	索	參	塞	省	葉	說	殺	辰	沈	拾	若	掠	略	亮	兩	涼	梁	糧	良
諒	量	勳	呂	女	廬	旅	濾	礪	閭	驪	麗	黎	力	曆	歷	櫟	年	憐	戀	撚	漣	煉	璉	季
練	聯	輦	蓮	連	鍊	列	劣	咽	烈	裂	說	廉	念	捻	殮	簾	獵	令	囧	寧	嶺	伶	玲	瑩
玲	聆	鈴	零	靈	領	例	禮	體	隸	惡	了	僚	寮	尿	料	樂	療	療	蓼	遼	龍	暈	阮	劉
杻	柳	流	溜	琉	留	硫	紐	類	六	戮	陸	倫	崙	淪	輪	律	慄	栗	率	隆	利	吏	履	易
李	梨	泥	理	痢	罹	裏	裡	里	離	匿	溺	吝	燐	磷	蘭	隣	鱗	麟	林	淋	臨	立	笠	粒
狀	炙	識	什	茶	刺	切	度	拓	糖	宅	洞	暴	幅	行	降	見	廓							

Latin (Germany): 7 Characters (3 Uppercase Characters, 4 Lowercase Characters)

Ä	Ö	Ü	ä	ö	ü	ß
---	---	---	---	---	---	---

Latin (Holland): 24 Characters (12 Uppercase Characters, 12 Lowercase Characters)

Ä	Ë	Ĭ	Ö	Ü	Á	É	Í	Ó	Ú	È	IJ	ä	ë	ï	ö	ü	á	é	í	ó	ú	è	ij
---	---	---	---	---	---	---	---	---	---	---	----	---	---	---	---	---	---	---	---	---	---	---	----

Latin (France): 30 Characters (15 Uppercase Characters, 15 Lowercase Characters)

É	À	È	Ů	Â	Ê	Î	Ô	Û	Ë	Ï	Ü	Ç	Œ	Æ	é	à	è	ù	â	ê	î	ô	û	ë
ï	ü	ç	œ	æ																				

Latin (Italy): 14 Characters (7 Uppercase Characters, 7 Lowercase Characters)

É	Ó	À	È	Ì	Ò	Ù	é	ó	à	è	ì	ò	ù
---	---	---	---	---	---	---	---	---	---	---	---	---	---

Latin (Spain): 14 Characters (7 Uppercase Characters, 7 Lowercase Characters)

Ñ	Á	É	Í	Ó	Ú	Û	ñ	á	é	í	ó	ú	ü
---	---	---	---	---	---	---	---	---	---	---	---	---	---

Latin (Portugal): 26 Characters (13 Uppercase Characters, 13 Lowercase Characters)

Á	É	Í	Ó	Ú	Â	Ê	Ô	Ã	Õ	À	Ü	Ç	á	é	í	ó	ú	â	ê	ô	ã	õ	à	ü	ç
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Latin (Denmark, Norway): 6 Characters (3 Uppercase Characters, 3 Lowercase Characters)

Æ	Ø	Å	æ	ø	å
---	---	---	---	---	---

Latin (Sweden, Finland): 6 Characters (3 Uppercase Characters, 3 Lowercase Characters)

Ä	Å	Ö	ä	å	ö
---	---	---	---	---	---

Latin (Iceland): 20 Characters (10 Uppercase Characters, 10 Lowercase Characters)

Á	Ð	É	Í	Ó	Ú	Ý	Þ	Æ	Ö	á	ð	é	í	ó	ú	ý	þ	æ	ö
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Latin (Poland): 18 Characters (9 Uppercase Characters, 9 Lowercase Characters)

Ą	Ć	Ę	Ł	Ń	Ó	Ś	Ź	Ż	ą	ć	ę	ł	ń	ó	ś	ź	ż
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Simplified Chinese: 6763 Characters

(All GB2312-1980 simplified Chinese characters. 3755 1st level Chinese characters and 3008 2nd level Chinese characters)

Traditional Chinese : 17561 Characters

(Big5-1984 characters 1st level 5401 characters, 2nd level 7650 characters, all HKSCS-2004 characters 4510 characters)

* There are 2 characters ("兀" and "設") registered with the same letter form.

The 2 duplicate Chinese characters return the character code (Unicode UCS-4) of the Chinese characters included in the CJK unified ideographs.

"設", of which 2 characters exist in the 2nd level, is processed as 1 character.

As a result of the above, the number of characters of the 2nd level of the Big 5 standard is 7652, but the number of characters that is recognized is 7650 characters.

Of the 4511 characters of the HKSCS 2004 Chinese characters, 4510 characters are characters targeted for recognition. "龜" U+F907 is not among the characters targeted for recognition.

"龜" U+9F9C of the same letter form is included in Big5-1984 1st level.

Therefore, the number of traditional Chinese characters for recognition is 17561 characters.

The 7 Eten extension characters "碁, 鏽, 恒, 裏, 墻, 粧, 嫺" are included in the Hong Kong character category.

* The character codes of one-byte characters (Unicode UCS-4) are returned as the recognition results for all alphanumeric characters and symbols. The recognition result of the backslash "\" is also returned as the character code of the 1-byte character (Unicode UCS-4).

The character codes of two-byte characters (Unicode UCS-4) are returned as the recognition result for all Katakana. To display two-byte alphanumeric characters, two-byte symbols, and one-byte Katakana as recognition results, take the required measures at the application level.