

Proposal to
Unicode Technical Committee

Proposal to add Sichuan Yi (ii) indexing to Unicode

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1 Summary

This proposal would add indexing for the Sichuan Yi syllabic writing system, by tagging Sichuan Yi syllables [U+A000 – U+A48C] and radicals [U+A490 – U+A4C6] with Unihan-like properties such as Yi Pinyin spelling, total strokes, radical, etc., and then building multiple indexes based on these property tags. Data file *SichuanYiSources.txt* maps property tag values to the code points. This would provide basic dictionary indexing and radical/stroke indexing for Sichuan Yi, both of which are standard tools for learning and using Sichuan Yi writing, but currently not supported in Unicode. The same data file could assign additional tags and values for other indexing methods.

2 Rationale

Using Unicode (15.1 and earlier) data, the 1,164 Sichuan Yi syllables can be sorted, but not indexed. While the default collation is correct, it does not place Yi syllables [U+A000 – U+A48C] in meaningful buckets for indexing. This is a problem because the 819 basic symbols have no systematic visual components to represent sound.¹

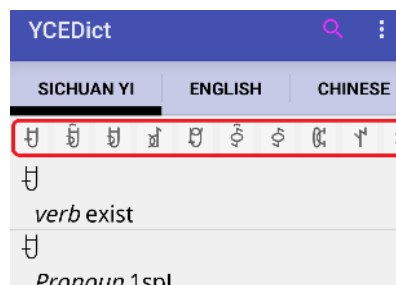


Figure 1: Dictionary app treats 1,000+ Yi syllables as major index headings

¹ Not counting 345 mid-high tone symbols, which are formed by adding a diacritic [^] like an inverted breve above a corresponding mid- or low- tone symbol. There are 1,164 total syllable symbols, plus the syllable iterator U+A015.

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For example, the dictionary app in Figure 1 automatically makes each Yi syllable character an index heading, as if it were a letter of the alphabet. To find a section the user would have to scroll horizontally across hundreds of buttons. *Linking Yi syllables and radicals with their Yi Pinyin spellings, radicals, and dictionary headings would leverage existing software features that use index exemplars to create functional indexes.* With proper indexing support, this app would automatically create forty nine index buttons, a much more practical number for browsing.

The standard Sichuan Yi dictionary *Yiyu Da Cidian* (1997) (abbreviated *YYDCD* below) organizes entries into forty nine major sections, one for each **romanized** Yi Pinyin grapheme that begins a syllable, and the major section headings **are** the Yi Pinyin graphemes (I,IE,A...B,P,BB,NB...NY,X,Y).

Section	Yi Character	Pinyin	Page			
I	uo	146	ba	186	pix	212
	uop	149	bap	191	pi	213
			buox	192	pip	213
			bao	192	pix	215
IE			buop	193	pie	215
			bat	193	piep	215
			box	194	pat	215
			bo	194	psx	222
A			bop	195	pe	223
			be	200	pep	237
			bep	200	puo	237
			bat	200	puop	237
UO			bux	201	pot	238
			bu	202	pox	238
			bop	204	pe	238
			burx	205	pop	240
O			bur	206	put	241
			byt	208	pix	241
			byx	209	pi	243
			by	209	piup	245
E			byp	210	piux	251
			byrx	210	piur	252
			byr	211	pyt	253
					pyx	253
B					py	254
					pyy	254
					pyt	254
					pyt	256
P					pit	212

Figure 3. YYDCD: Alphabetical index (first page) with major section headings

Section	Yi Character	Pinyin	Page
P			
	pit	212	
	pix	215	

Figure 2. YYDCD: First page of P section, page 212

For Yi syllable characters to be learned and used, they must be associated with their Yi Pinyin spellings. When a user encounters an unrecognized Yi character, they may look for the Yi Pinyin spelling using a radical + stroke or total strokes index. Knowing the spelling, the user can then pronounce the syllable, type it, or browse for it in a dictionary. Reading, dictionary arrangement, and keyboard input depend on these standard indexing schemes, but Unicode does not yet support them for Sichuan Yi.

Because the Yi Pinyin index exemplars are not part of the Yi syllable [U+A000 – U+A48C] and Yi radical [U+A490 – U+A4C6] code point ranges, a source data file is needed to link Yi syllables to their Yi Pinyin spellings for indexing. Fortunately, the basic scheme for doing this is already in use for other East Asian scripts, including Han, Nüshu, Tangut, and others. (See [TR #35: Collation Indexes.](#))

The current proposal would create the source data file *SichuanYiSources.txt* and add standard indexing schemes by associating Yi syllables and radicals with Unihan-like property tags and values.

3 Source data files

SichuanYiSources.txt, supplies data in four property tags for specific ranges of Yi syllables and radicals, with a total of 3,603 data lines.

SichuanYiRadicals.txt (or *SichuanYiRSIndex.txt* in newer format) provides a mapping from the Yi radical numbers used in the `kSY_RS` property to the corresponding character in the Yi Radicals block.

FractionalUCA_Yi.txt is provided as test data against an autogenerated Sichuan Yi RS index.

4 Property tags for Yi syllables and Yi radicals

Proposed tag names begin with *k* and *SY* (for Sichuan Yi). Table 1 summarizes the purpose, scope, and content for each of the four property tags. While the current proposal seeks only to add support for the basic indexing schemes, other indexing schemes would be of value, and could be implemented in a similar manner. See Section 9 .

The property tags intentionally give priority to transparency of data and functional indexing, but with concessions for efficient storage and processing.

4.1 Example: Yi syllables *nbiex* 𐺧 and *nbie* 𐺧

Example lines from *SichuanYiSources.txt* for Yi syllables *nbiex* 𐺧 and *nbie* 𐺧 :

U+A07A	<code>kSY_Pinyin</code>	<code>nbiex.NB</code>
U+A07A	<code>kSY_Syll_Sort</code>	<code>0122</code>
U+A07A	<code>kSY_VariantOf</code>	<code>U+A07B</code>
U+A07B	<code>kSY_Pinyin</code>	<code>nbie.NB</code>
U+A07B	<code>kSY_RS</code>	<code>25.4.3</code>
U+A07B	<code>kSY_Syll_Sort</code>	<code>0123</code>

The inverted Breve diacritic in Yi syllable *nbiex* 𐺧 U+A07A shows it is a mid-high tone syllable whose base character is the mid-tone syllable *nbie* 𐺧 U+A07B. Both of these syllables begin with Yi Pinyin

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grapheme “ *nb* ” written uppercase “ *NB* ” when used as a dictionary heading. These two syllables are listed 122nd and 123rd respectively in YYDCD.

The *Yiwen Jianzi Ben* (1984-2012) indexes Yi syllable *nbie* 𐰃 under Yi radical 25, with primary form YI RADICAL ZZIET 𐰃 U+A4C4 and secondary form YI RADICAL NBIE 𐰃 U+A4C5. Syllable symbol 𐰃 (*nbie*) is written with four strokes, two from the radical 𐰃 and two are residual strokes. Subkey “ 3 ” sorts 𐰃 *nbie* within the RS index bucket for Radical 25 plus 2 residual strokes, and the index bucket for 4 total strokes and radical “ 𐰃 𐰃 ”.

Table 1. Summary of basic property tags for Yi syllables and Yi radicals

Property Tag	Purpose	Scope	Content
kSY_Pinyin	<ol style="list-style-type: none"> 1. Generate standard Yi Pinyin dictionary headings. 2. Place entries and subentries into their dictionary sections. 3. Pronunciation guide. 4. Transliteration and keyboard input. 	<p>All 1,165 Yi syllables.</p> <p>All 55 Yi radicals.</p> <p>No index heading for syllable iterator U+A015.</p>	<p>Yi Pinyin spelling of the whole syllable.</p> <p>Yi radicals are spelled with trailing “b”.</p> <p>Dot separator.</p> <p>Yi Pinyin dictionary heading (1 or 2 upper case Latin letters).</p>
kSY_RS	RS and TS lookup apparatus to find Yi Pinyin spelling	<p>819 basic Yi syllables.</p> <p>All 55 Yi radicals</p> <p>Exclude syllable iterator U+A015.</p> <p>Exclude 345 mid-high tone syllables.</p>	<p>Yi radical number, as indexed in YWJZB.</p> <p>Total strokes to write the syllable (or radical) symbol.</p> <p>Subkey for sorting within sections.</p>
kSY_SyllSort	Capture syllable sort order from <i>Yiwen Guifan Zibiao</i> , as referenced in <i>Yiwen Guifan Fang'an</i> .	All Yi syllables, except syllable iterator U+A015.	Four digit numerical sort key 0000-1164.
kSY_VariantOf	Link each mid-high tone character to its mid- or low-tone base character.	345 mid-high tone Yi syllables.	Code point of mid- or low-tone base Yi syllable.

4.2 Example: Yi radicals *zziet* † and *nbie* †

The property tags apply in a slightly different way to Yi radicals. In **kSY_Pinyin** Yi radicals append "b" to distinguish their Yi Pinyin input string and transliteration from Yi syllables that would otherwise have the same glyph shape or the same spelling. In addition, the Yi Pinyin index heading is left blank for Yi radicals because they are not indexed in *YYDCD*.

Each of the 55 Yi radical code points is either a primary or secondary form of one of the 26 Yi radicals in *YWJZB*. The index callout for Yi radical 25 appears as below in *YWJZB* with *zziet* † as the primary form and *nbie* † in parentheses as the secondary form of radical 25.

(25) † (†)

For Yi radicals, the first segment of **kSY_RS** is the radical number (1-26). The second segment is the stroke count for that radical number, either "1" or "2". The third segment (the "subkey") is "0" for the primary form of each radical. Secondary forms have a "subkey" of 1-4 according to their relative position in the radical index heading.

U+A4C4	kSY_Pinyin	zzietb
U+A4C4	kSY_RS	25.2.0
U+A4C5	kSY_Pinyin	nbieb
U+A4C5	kSY_RS	25.2.1

4.3 kSY_Pinyin – Yi Pinyin spelling

Yi Pinyin spelling and dictionary heading overlap in their content, but differ in their function. Accordingly, **kSY_Pinyin** puts them in a single tag but separates them by case and by a dot separator. The first value segment is Yi Pinyin spelling, consisting of 1 – 6 lower case Latin letters. The second value segment is a Yi Pinyin grapheme given as 1 – 2 upper case Latin letters.

U+A07B	kSY_Pinyin	nbie.NB
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Every Yi syllable character is linked to one and only one Yi Pinyin spelling. This is the standard reading, and it is the piece of information a reader is most likely to need when encountering an unknown Yi character.

Print dictionaries for both Sichuan Yi and Simplified Chinese commonly use Latin graphemes to head their main dictionary sections. *Because Latin letters are not part of the Yi script, Yi syllables must be explicitly linked to their dictionary headings.* For this purpose, **kSY_Pinyin** tags all the Yi syllables, including mid-high tones with their Yi Pinyin spelling and dictionary heading.

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Even though the default collation for Yi syllables is based on Yi Pinyin (*Yiwen Guifan Fang'an 1980*), it is recommended to sort Yi syllables and words in their un-transliterated form. The collation tailoring for Yi Pinyin is not identical to the tailoring for YYDCD index headings and it is not as stable as the DUCET for sorting polysyllabic words and expressions. This is because the full tailoring for Yi Pinyin must attempt to account for null initial consonant, re-use of graphemes in different functional slots, syllable-final tone letters (including null), space-separated syllables, space-separated words, apostrophe-as-disambiguator, and the syllable iterator. In contrast, the collation tailoring for Yi dictionary headings can be simple and stable as a separate tailoring in *CLDR common > Collation > ii.xml*. in parallel format to the 'private-pinyin' collation tailoring shown in *zh.xml* in the same directory.

See *Appendix - Table of standard Yi characters*. See also the section *Yi Pinyin sort order*.

Property	kSY_Pinyin
Syntax	[a-z]{1-6}\.[A-Z]{1,2}
Scope	Yi Syllables U+A000-U+A48C* and Yi Radicals U+A490-U+A4C6. * The dictionary segment is empty for syllable iterator U+A015.
Description	<p>A string of one to six Latin letters, dot separator, then one or two Latin letters.</p> <p>Content:</p> <p>The first value segment is the Yi Pinyin transliteration of the syllable or radical (1-6 lower case Latin letters), following the <i>Yiwen Guifan Fang'an (1980)</i>. Dot separator. The second value segment is the Yi Pinyin index exemplar (1-2 upper case Latin letters) under which the syllable appears in a dictionary like YYDCD.</p> <p>Syllable iterator U+A015, has pinyin spelling "w" but it has no index exemplar because it is not indexed in dictionaries.</p> <p>For Yi radicals [U+A490 – U+A4C6], "b" is appended to the nominal Yi Pinyin spelling (consistent with the Microsoft Yi IME), making the length 3-6 Latin letters including the trailing "b," and the index exemplar is empty.</p> <p>Even though the default collation for Yi syllables is based on Yi Pinyin (<i>Yiwen Guifan Fang'an 1980</i>), it is recommended to sort Yi syllables and words in their un-transliterated form. The collation tailoring for Yi Pinyin is not identical to the tailoring for YYDCD index headings and it is not as stable as the DUCET for sorting polysyllabic words and expressions. This is because the full tailoring for Yi Pinyin must attempt to account for null initial consonant, re-use of graphemes in different functional slots, syllable-final tone letters (including null), space-separated syllables, space-separated words, apostrophe-as-disambiguator, and the syllable iterator. In contrast, the collation tailoring for Yi dictionary headings can be simple and stable as a separate tailoring in <i>CLDR common > Collation > ii.xml</i> in parallel format to the 'private-pinyin' collation tailoring shown in <i>zh.xml</i> in the same directory.</p>

4.4 kSY_RS – Yi Radical-Stroke indexes

For comparison, Tangut uses **kRSTUnicode** for the Radical+Stroke index tag, and it is assigned in TangutSources.txt as described in ISO 10646 (ISO/IEC 2020: 41).

Property	kSY_RS
Syntax	[1-2][0-9]?\. [0-6]
Scope	Yi Syllables U+A000 - U+A48C, EXCEPT mid-high tone syllables. Yi Radicals U+A490 - U+A4C6.
Description	<p>First value segment. The number (1-26) of the Yi radical category under which the Yi syllable character is indexed in <i>Yiwen Jianzi Ben</i> (1978-2012).</p> <p>Dot separator.</p> <p>Second value segment. Total number (1-8) of strokes to write the Yi character.</p> <p>Dot separator.</p> <p>Third value segment. Subkey (0 - 34) for sorting within Stroke or Radical bucket.</p> <p>For Yi radicals the subkey gives the relative order of secondary forms of Yi radicals.</p> <p>Residual strokes is defined as the number of additional strokes (0-6), after the radical, needed to write the symbol. Radical strokes plus Residual strokes equals Total strokes. Radicals 22-26 with their variants, each have two strokes; all the other radicals have only one stroke.</p> <p>kSY_RS is assigned for Yi syllables classified in <i>Yiwen Jianzi Ben</i> (1978-2012) radical - stroke and total stroke indexes. Notably, this excludes mid-high tone syllables and the syllable iterator U+A015.</p> <p>The RS index sorts first by Yi radical number, then by residual strokes, then by subkey. The TS index sorts first by total strokes, then by radical, then by subkey.</p> <p>The RS index is often used to find the standard reading for an unrecognized Yi syllable symbol. Having found the transliteration, a reader can pronounce the syllable (including its mid-high tone variant), type it on a keyboard, or locate its dictionary entry alphabetically.</p> <p>The Total Strokes index can be helpful when a reader does not find a desired syllable by the Radical+Stroke method.</p> <p>At primary level, Yi syllables with fewer total strokes sort first. At secondary level, Yi syllables are sorted by their radical number. At tertiary level (within a given TotalStrokes+Radical bucket) the subkey sorts syllables following the <i>Yiwen Jianzi Ben</i> (1984-2012).</p> <p>The number of total strokes is a stable value that can be defined for any Yi Syllable or Yi Radical.</p>

4.5 kSY_SyllSort

The sort order for Yi syllables is based on [get content from description further down].

Property	kSY_SyllSort
Syntax	[0-1]{2}[0-9]{2}
Scope	<i>Yi Syllables U+A000 - U+A014 U+A016 - U+A48C.</i> Mid-high tone syllables ARE numbered. Syllable iterator U+A015 is NOT numbered.
Description	Four digit sort key (0000-1164), following the <i>Guifan Yiwen Zibiao (1980)</i> and the <i>Yiyu Da Cidian (1997) (YYDCD)</i> . Syllable "it" U+A000 is number 0001. Syllable "yyr" U+A48C is number 1164. This sort order is derived from the <i>Guifan Yiwen Zibiao (1980)</i> , beginning with syllable <i>it</i> 𪛗 at the top left and proceeding down each column in turn to syllable <i>yyr</i> 𪛚 at the bottom right, covering all 1,164 standard Yi syllables in their canonical order.

4.6 kSY_VariantOf

kSY_VariantOf tags mid-high tone syllables to show their relationship to a mid- or low-tone Yi syllable.

Property	kSY_VariantOf
Syntax	U+xxxx
Scope	This field is populated only for mid-high tone Yi syllables.
Description	The value is the code point of the base form (the mid- or low-tone syllable character) on which this mid-high tone character is based. This property tag is applied only to mid-high tone Yi syllable characters to link them to their base forms.

5 Source data file *SichuanYiSources.txt*

SichuanYiSources.txt would provide the raw data to associate property tags and values with Yi syllables and Yi radicals.

In its indexing function, *SichuanYiSources.txt* would be parallel to *TangutSources.txt*, and *NushuSources.txt*, by [extending of Unihan-like properties to non-Unihan characters](#). (UAX #38 Unihan)

6 Standard indexing schemes

- Dictionary index heading, following *Yiyu Da Cidian* (1997)
- Yi Pinyin transliteration, with unique sort order, from *Yiwen Guifan Fang'an* (1980)
- Radical - stroke (RS), from *Yiwen Jianzi Ben* (1978) (YWJZB below)
- Total strokes - radical (TS), also from YWJZB (1978)

While the current proposal seeks only to add support for these basic indexing schemes, other indexing schemes would be of value, and could be implemented in a similar manner.

7 What the property tags need to do

Property tags of Yi syllables and radicals need to work together to do the following:

- Link each Yi syllable with its Yi Pinyin transliteration and dictionary heading

Character	Code point	Yi Pinyin spelling	Dictionary heading
𐄏	U+A07B	<i>nbie</i>	<i>NB</i>

- Link each indexed Yi syllable with its numbered Yi radical.
- Link each Yi radical and indexed Yi syllable to its stroke count.

	Yi syllable	=	Yi Radical	+	Residual strokes
	U+A07B NBIE		U+A4C5 NBIE (Rad # 25)		Two horizontal bars
Composition	𐄏	=	𐄏	+	- -
Stroke count	4	=	2	+	2

- Feed stable sorting for the various indexing schemes.
- Link secondary forms of Yi radicals with their primary forms.

Yi radical # 18 Primary form	Yi radical # 18 Secondary forms
𐄏 (U+A4AC)	𐄏 (U+A4AD)、𐄏 (U+A4AE)、𐄏 (U+A4AF)

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- Distinguish Yi radicals from Yi syllables where their shapes or Yi Pinyin names are the same.
- Allow syllable iterator U+A015 and mid-high tone syllables to be included or excluded as appropriate for each indexing scheme

The tables below show related (informal) properties for sample Yi syllables and their associated Yi radicals. These informal descriptions are recast in this proposal as a set of Unihan-like property tags, with formal definitions and usage.

Table: YI SYLLABLE NBIE U+A07B 𐄂 informal properties

Property	Value	Note
Code Point	U+A07B	Yi syllables U+A000 – U+A48C
Code Point Name	YI SYLLABLE NBIE	
Character	𐄂	
Yi Pinyin transliteration	nbie	Each Yi syllable has just one Yi Pinyin spelling, as reflected in its Code Point Name.
Main dictionary section	NB	Yi Pinyin grapheme that begins syllable. 1-2 letters.
Total strokes	4	Yi syllable characters have 1-8 strokes.
Residual strokes	2	Residual strokes = Total strokes - Strokes in radical
Associated Yi radical	U+A4C5 YI RADICAL NBIE 𐄃	Main component of handwritten Yi syllable character. See properties in next table.

Table: Associated YI RADICAL NBIE U+A4C5 𐄃 informal properties

Property	Value	Note
Code Point	U+A4C5	Yi radicals U+A490 - U+A4C6.
Code Point Name	YI RADICAL NBIE	
Character	𐄃	Different glyph shape from U+A07B YI SYLLABLE NBIE
Yi Pinyin transliteration	nbie	Same transliteration as U+A07B YI SYLLABLE NBIE.
Belongs to Yi radical number	25	U+A4C5 YI RADICAL NBIE 𐄃 is a secondary form of radical 25 (of 26 numbered Yi radicals). Each has a primary form and 0 to 4 secondary forms.
Primary form of Yi radical	U+A4C4	U+A4C4 YI RADICAL ZZIET 𐄄 is the primary form of radical 25.

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Strokes in Yi radical	2	Radicals 1-21 (U+A490 - U+A4BB), have 1 stroke. Radicals 22-26 (U+A4BC - U+A4C6) have 2 strokes.
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Table: YI SYLLABLE YI U+A473 𑄱 informal properties

Property	Value	Note
Code Point	U+A473	Yi syllables U+A000 – U+A48C
Code Point Name	YI SYLLABLE YI	
Character	𑄱	
Yi Pinyin transliteration	yi	
Main dictionary section	Y	Yi Pinyin grapheme that begins syllable.
Total strokes	4	Yi syllables have 1-8 strokes.
Residual strokes	3	Residual strokes = Total strokes - Strokes in radical
Associated Yi radical	U+A49C YI RADICAL MOP 𑄲	Main component of Yi syllable character. See properties in next table.

Table: Associated YI RADICAL MOP U+A49C 𑄲 informal properties

Property	Value	Note
Code Point	U+A49C	
Code Point Name	YI RADICAL MOP	
Radical shape	𑄲	Has the same glyph shape as YI SYLLABLE MOP U+A0C0.
Yi Pinyin transliteration	mop	Has the same transliteration as YI SYLLABLE MOP U+A0C0.
Yi radical number	10	Number 10 of 26 numbered Yi radicals. Each has a primary form and 0 to 4 alternate forms.
Primary form of Yi radical	U+A49C	U+A49C is the primary form of radical 10.
Strokes in Yi radical	1	Radicals 1-21 (U+A490-U+A4BB), have 1 stroke. Radicals 22-26 (U+A4BC-U+A4C6) have 2 strokes.

8 Property model questions

When defining and applying property tags to Yi syllables and radicals, important trade-offs become apparent. Answers are suggested for some of the choices, based on criteria such as functionality, data preservation, transparency, stability, efficiency of storage / maintenance and processing.

8.1 Scope of the Radical – Stroke (RS) index

Following YWJZB and YYDCD, this proposal indexes only the 819 basic syllables.

Like the YWJZB, YYDCD gives an RS index that does *not* include mid-high tone syllables, and indeed this approach is the most functional.

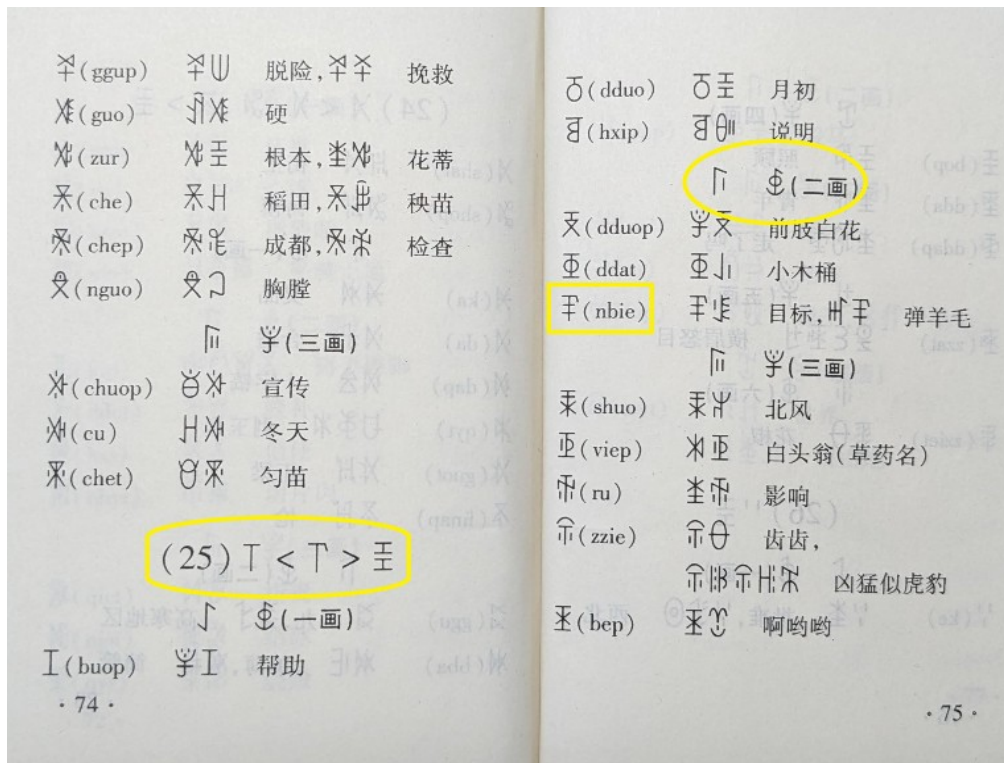


Figure 4. Location of symbol 𠃉 under radical 𠃇 plus 2 strokes. Yiwen Jianzi Ben (2012:74-75)

YWJZB guides a reader to the Yi Pinyin spelling of an unrecognized Yi character by systematically narrowing the field of possibilities, first of all by not listing mid-high tone syllables. Then from the remaining 819 basic syllable symbols, it narrows to those with a specific radical, until the field of selection is small enough for the user to identify a unique symbol. This system facilitates efficient look up by reducing the amount of text in the index and by keeping its organization simple.

For instance, if a reader encounters the symbol 𐺧 , they know from the diacritic that this is the mid-high tone character for syllable 𐺧 . They can immediately narrow their search field from 1,165 symbols to 819. Then using *YWJZB*, they identify the character's radical 𐺧 (#25), find its section (page 74), and then the subsection for two additional strokes. There they find “ 𐺧 (nbie)” with just two other entries in its subsection.

8.2 Sorting Yi syllables that have the same RS or TS index value

YWJZB provides both an RS index and a Total Strokes index. In these two sorting schemes, the relative order of Yi syllables within an index section is the same because it is based on a standard way of writing the characters. This lower level sort order can be captured as a single numerical subkey for each syllable that gives its relative position in the two indexes. This subkey will allow the Sichuan Yi section of *FractionalUCA.txt* to be generated from the data in each new version of CLDR and Unicode.

To sort correctly for the RS index, the **kSY_RS** number can be used directly to group the syllables first by radical, then by total strokes, then by subkey. To recreate the TS index ordering, syllables are first sorted by residual strokes (calculated as total strokes minus strokes in radical), then by radical number, then by subkey.

For reference, a static version of the proposed Sichuan Yi section of *FractionalUCA.txt* is provided (Appendix – RS test lines from Sichuan Yi section of *FractionalUCA.txt*) as a test file. See also ISO/IEC JTC1/SC2/WG2 N1187 Annex B (Everson 1995a).

8.3 Distinguishing Yi syllables from Yi radicals when their property tag values overlap

A different Yi Pinyin spelling convention is proposed for Yi radicals, to distinguish them from Yi syllables that normally share their Yi Pinyin spelling.

Comparing YI SYLLABLE LI (U+A1B9) and YI RADICAL LI (U+A491), even though the code points and the glyph shapes are distinct, their Yi Pinyin spellings would normally be the same. In a reverse transliteration, the Yi Pinyin string **LI** would not tell you whether to output a Yi syllable or a Yi radical. To preserve the distinction there will be needed, either (1) a different Yi Pinyin transliteration for Yi radicals; or (2) a separate Yi Pinyin property tag for Yi radicals.

In a second example, YI SYLLABLE MOP 𐺧 (U+A0C0) and YI RADICAL MOP 𐺧 (U+A49C) have the same glyph shape, and the same Yi Pinyin spelling.

It is proposed here to add a trailing “ b ” to the Yi Pinyin spelling of Yi radicals, as Microsoft has done in their Yi IME for Windows. (Presumably “ b ” is from 𐺧 *bbur bop* 'radical'.) This will distinguish the Yi radical code point from a Yi syllable that would otherwise be spelled the same.

Unicode Name	Character	Code Point	Yi Pinyin spelling	MS Yi IME spelling	Proposed kSY_Pinyin
YI SYLLABLE LI	𪛗	U+A1B9	li	li	li
YI RADICAL LI	𪛘	U+A491	li	lib	lib
YI SYLLABLE MOP	𪛙	U+A0C0	mop	mop	mop
YI RADICAL MOP	𪛚	U+A49C	mop	mopb	mopb

8.4 Linking secondary Yi radical forms to their primary forms

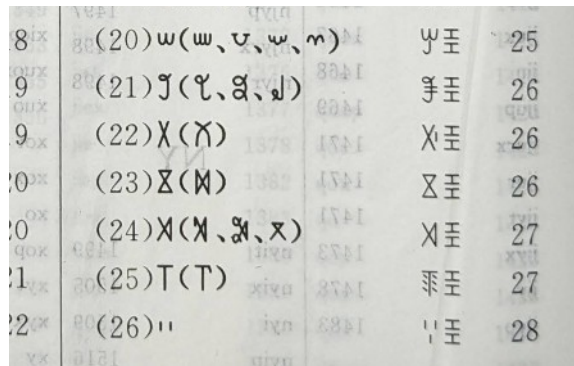


Figure 5. Portion of radical index showing 26 primary Yi radicals with their secondary forms, comprising 55 Yi Radical code points in all. (YYDCD 1997:12).

For Yi radicals that are secondary forms of one of the 26 primary Yi radicals, **one or both** of the following approaches may be needed to link them to the primary forms.

8.4.1 Mapping file *SichuanYiRadicals.txt*

Mapping file *SichuanYiRadicals.txt* (similar to *CJKRadicals.txt*) links each of the 55 Yi radical code points to one of the 26 primary Yi radicals. The file has one line per Yi Radical code point. Each line contains two fields separated by a semicolon (';'). The first field is the Yi radical number. The second field is the code point of the Yi radical character. The following sample lines show the primary and secondary forms of Yi radicals 24-26.

Sample lines from *SichuanYiRadicals.txt* for Yi radicals 24-26:

```
24; A4C0 # 𪛛 SHAT
24; A4C1 # 𪛛 ZUR var of 24 SHAT
```

24; A4C2 # 𠄎 SHOP var of 24 SHAT
 24; A4C3 # 𠄏 CHE var of 24 SHAT
 25; A4C4 # 𠄐 ZZIET
 25; A4C5 # 𠄑 NBIE var of 25 ZZIET
 26; A4C6 # 𠄒 KE

8.4.2 Tag Yi syllables and radicals

Parallel to what is done for CJK radicals in *Unihan_IRGSources.txt*, *SichuanYiSources.txt* can use the radical numbers from *SichuanYiRadicals.txt* in its RS values, to place each syllable in its RS index bin, and to show primary and secondary radical forms in the heading for that bin. ²

Sample lines from *SichuanYiSources.txt*:

For 𠄎 U+A024 YI SYLLABLE BUOP

U+A024	kSY_Pinyin	buop.B
U+A024	kSY_RS	25.3.1
U+A024	kSY_Syll_Sort	0036

For 𠄑 U+A07A YI SYLLABLE NBIEX

U+A07A	kSY_Pinyin	nbiex.NB
U+A07A	kSY_Syll_Sort	0122
U+A07A	kSY_VariantOf	U+A07B

For 𠄒 U+A07B YI SYLLABLE NBIE

U+A07B	kSY_Pinyin	nbie.NB
U+A07B	kSY_RS	25.4.3
U+A07B	kSY_Syll_Sort	0123

For 𠄑 U+A4C5 YI RADICAL NBIE

U+A4C5	kSY_Pinyin	nbieb
U+A4C5	kSY_RS	25.2.1

For 𠄐 U+A4C4 YI RADICAL ZZIET

U+A4C4	kSY_Pinyin	zzietb
U+A4C4	kSY_RS	25.2.0

² In *XRadicalProperties.txt*, (*unicodetools/data/other/XRadicalProperties.txt*) APOSTROPHE is only used to generate separate lines to distinguish Hans from Hant radicals; when multiple code points map to the same radical number without the apostrophe, they are simply listed in the index header in DUCET order.

9 Collations for Sichuan Yi

For the additional indexing schemes, collations will be needed as follows. DUCET is listed for reference and comparison.

- Default. DUCET sorts Yi syllable symbols correctly by reference to their code point values.
- YiLatinIndex. Collation tailoring for Yi Pinyin dictionary index headings only, different from the Yi Pinyin collation tailoring that can sort whole Yi Pinyin syllables.
- YiPinyin. Collation tailoring for sorting whole Yi Pinyin syllables (or multi-syllable words).
- RS_YWJZB. Radical+stroke. Similar to that used for Chinese characters and described in the LDML standard, Part 5: Collation (2021), *SichuanYiSources.txt* will identify the numbered radical and residual strokes required to write the syllable symbol. Primary level is Yi Radical; secondary is number of residual strokes; tertiary level follows YWJZB or defaults to DUCET. The data for a Yi radical+stroke collation come from the *Yiwen Jianzi Ben* (1978) and the primary and secondary levels been summarized for easy use in *YI_DATA.TXT* (West 2001). Each syllabary character is tagged with a decimal number to identify its unique associated radical and number of residual strokes. For the static sort order from YWJZB, see *Radical sort of the Yi script* (Everson 1995a).
- SR_YWJZB. Each syllabary symbol is listed, first by its total number of strokes, then by its associated radical, then follows the YWJZB (or defaults to DUCET). This will approximate the index in pages 82-121 of *Yiwen Jianzi Ben* (1978). This method helps a user to identify a character when its primary radical association is not obvious. This collation is not detailed in *YI_DATA.TXT*. Stroke+radical values may be calculated from Radical+stroke values because each radical has a known number of strokes. For the static sort order from YWJZB, see *Stroke order sort of the Yi script* (Everson 1995b).
- OPTIONAL. European Ordering Rules (EOR) would sequence Yi Pinyin language strings using standard Latin sorting rules (starting with A, ending with Z). As a non-standard alternate, this could make Sichuan Yi more accessible to users unfamiliar with the language.

10 Background:

Nuosu Yi language community and writing systems

The Nuosu Yi (or Sichuan Yi) language community is centered in the Yi Autonomous Prefecture in southern Sichuan Province, China, with 2.85 million Nuosu Yi people in 2019. (Liangshan Yi Autonomous Prefecture Statistics Bureau 凉山彝族自治州统计局 *liáng shān yí zú zì zhì zhōu tǒng jì jú* 2022) As a language variety, Sichuan Yi names the Northern Yi dialect family, which includes six or more sub-varieties (CHEN 陈, BIAN 边 & LI 李 1985; Eberhard, Simons & Fennig 2020). The standardized form of the language is based on a phonemic analysis of the Shypnra variety spoken in Xide County (ZHANG 张 & ZHAO 赵 1986: 3). This proposal concerns the standard variety, though further proposals could be developed for other varieties in the Northern Yi dialect family.

10.1 Description:

ii-Yiii – Sichuan Yi language written with Yi script

The standardized form of Yi script, along with its romanization, was approved by the China State Council in 1980 (*Yiwen Guifan Fang'an*. Zhong guo guo wu yuan 中国国务院 [China State Council] 1980). Written Sichuan Yi is used in traditional and contemporary religion, reference books, newspapers, education, novels and short stories, art, public signs and notices, and subtitles for video materials. Sichuan Yi is taught in public education from primary school through university, and in certain schools it is also used as the primary language of instruction.

Sichuan Yi uses 1,164 syllable symbols, one syllable iteration symbol, and 55 radical symbols.³ These have no upper/lower case distinction and no consistent pattern of phonemic correspondences in their basic shapes, except that 345 of them use a diacritic [^] like an inverted breve to indicate mid-high tone. Each syllable symbol may be analyzed to its radical + additional strokes, and this provides the primary method for finding pronunciation of an unrecognized character. (*Yiwen Jianzi Ben*. 1978)

In running text, the characters are normally printed left to right and top to bottom without spacing between words or syllables, similar to Hans. In some contexts, characters may be printed top to bottom and right to left.

Punctuation symbols and their usage are the same as Hans. The syllable iteration symbol 𑄎 (romanized **-w**) indicates reduplication of the preceding syllable, and so does not have a unique phonetic value. Table 1 shows the Yi syllabary table, including 1,164 syllabary symbols, with each character indexed by its Latin consonant, vowel, and tone.

³ WU(1996) and SHAMA(2000: 46–55) use additional glyphs to represent brush strokes, to define basic component shapes, and to map keys for computer input of Yi syllable symbols.

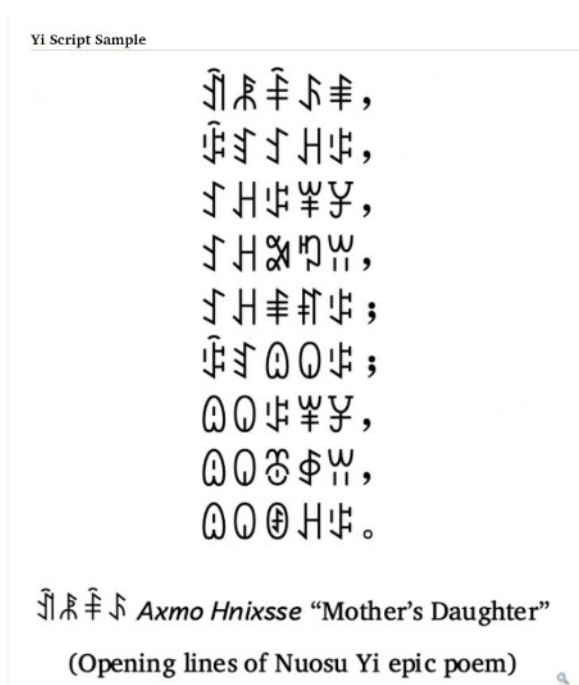


Figure 5. Yi script sample from Nuosu SIL font product site. (2019)

Similar to Han, Tangut, and Nüshu, Yi syllable symbols may be indexed using multiple schemes: DUCET, total strokes+radical, radical+strokes, Yi Pinyin, IPA, European Ordering Rules (EOR), and possibly others.

10.2 Yi Pinyin Romanization / transliteration

The standard Yi syllabary depends on its romanization, formally named 规范彝文注音符号 *Guifan Yiwen Zhuyin Fuhao*; informally it is also referred to as 彝语拼音 *Yiyu Pinyin*, or *Yi Pinyin*.

Yi Pinyin is the apparatus for learning and using ii-Yiii. It is used for teaching, for indexing, for typing, and for a pronunciation guide. In public education settings, students first memorize the Yi Pinyin vowels, consonants, and tones in their canonical order as the framework for learning to read and write the syllabary symbols. Yi Pinyin graphemes define the indexed sections in the *YYDCD (1997)*.

Yi Pinyin provides the most straightforward method for typing Yi syllable symbols. When a reader encounters an unrecognized Yi syllable symbol, they will look for its pronunciation to be given in Yi Pinyin. Walters (2021: 272) found that Nuosu people wanted to learn Yi Pinyin because it made them able to learn more of their language on their own.

With such a large syllable inventory, and without systematic sound components in the syllable symbols, Yi Pinyin carries a significant functional load in the overall scheme for written Sichuan Yi.

10.2.1 Yi Pinyin graphemes

Yi Pinyin uses 26 Latin letters singly and in digraphs (no diacritics or joiners), to compose 10 vowel graphemes, 43 consonant graphemes, 3 syllable-final tone graphemes, and the syllable iteration symbol. Nineteen syllables are written with no initial consonant, and three hundred forty two (mid-level tone syllables) are written without a tone letter. Null initial consonant and null tone letter are not explicitly defined, but for Unicode they are significant because a UCA collation tailoring must account for them.

Table 2: Graphemes for ii-Latn, ordered left to right and top to bottom

Consonants:									
<i>[null]</i>									
<i>b</i>	<i>p</i>	<i>bb</i>	<i>nb</i>	<i>hm</i>	<i>m</i>	<i>f</i>	<i>v</i>		
<i>d</i>	<i>t</i>	<i>dd</i>	<i>nd</i>	<i>hn</i>	<i>n</i>	<i>hl</i>	<i>l</i>		
<i>g</i>	<i>k</i>	<i>gg</i>	<i>mg</i>	<i>hx</i>	<i>ng</i>	<i>h</i>	<i>w</i>		
<i>z</i>	<i>c</i>	<i>zz</i>	<i>nz</i>		<i>s</i>	<i>ss</i>			
<i>zh</i>	<i>ch</i>	<i>rr</i>	<i>nr</i>		<i>sh</i>	<i>r</i>			
<i>j</i>	<i>q</i>	<i>jj</i>	<i>nj</i>		<i>ny</i>	<i>x</i>	<i>y</i>		
Vowels:									
<i>i</i>	<i>ie</i>	<i>a</i>	<i>uo</i>	<i>o</i>	<i>e</i>	<i>u</i>	<i>ur</i>	<i>y</i>	<i>yr</i>
Tones as syllable final letters:									
high	mid-high	mid-level	low-falling						
<i>-t</i>	<i>-x</i>	<i>[null]</i>	<i>-p</i>						
Syllable iteration symbol									
<i>-w</i>									

10.2.2 Yi Pinyin and *The Standard Yi Syllabary Table*

Each Yi syllable symbol corresponds to one and only one phonemic syllable⁴. *The Standard Yi Syllabary Table* (Appendix 11.1) uses the ordered Yi Pinyin graphemes to sequence the entire inventory of syllabary symbols, beginning with null consonant at the top left of the table (syllable 𐺑 *it*)

⁴ In Yi Pinyin, a few rare syllables are conflated: /hnyip/ mapped to /nyip/. (Yiwen Guifan Fang'an 1980)

and proceeding all the way down each column in turn to syllable 𪛗 *yyr* at the bottom right. This is the basis for the ordering of Yi syllables in Unicode⁵.

10.3 Yi Pinyin casing, word breaking, and punctuation

Yi Pinyin uses upper case letters to head dictionary sections, or in contexts where text is desired as all caps. In some contexts, an upper case letter may be used to begin proper nouns, though it is not done in *YYDCD* (1997) or *Han Yi Cidian* (1989).

Yi Pinyin normally separates words with spaces in running text, e.g., in dictionary entries, linguistic analysis, or computer processing, producing strings like *nuosu vitga* ‘Yi clothing’. Within polysyllabic words, *Han Yi Cidian* (1989) and *YYDCD* (1997) insert apostrophe [U+0027] or single right quotation mark [U+2019] at syllable boundaries where a syllable-final tone letter could be mistaken for a syllable initial consonant:

yyxo → *yyx'o* ‘north’
 (*yy xo)
nepa → *ne'pa* ‘cloth pad’
 (*nep a)

In practice, punctuation for Yi Pinyin is not defined very tightly because it is not often used for running text. For Unicode transforms, provisional usage could follow Hanyu Pinyin, with preference for half-width punctuation forms.

10.3.1 Yi Pinyin sort order

Yi Pinyin groups its graphemes by place of articulation and manner of articulation beginning with high front vowels, labial consonants, and high tone. (Bopomofo is ordered on similar principles.) This creates a *unique alphabetical order with no relation to European Ordering Rules (EOR)*. In this point Yi Pinyin differs from Hanyu Pinyin, which relies on EOR with just a few lines of tailoring for its collation.

The Yi Pinyin syllable pattern is (C)V(T). Every syllable is written with a vowel grapheme; some syllables write no consonant and some syllables write no tone letter. Syllables beginning with a null consonant precede others. Syllables that begin with the same consonant are sorted next by vowel, and then by tone.

When a Latin letter is re-used in a different functional slot in the syllable, it poses no difficulty for human readers, but it complicates the UCA collation tailoring. Note that consonant graphemes *null- p- t- x-* are re-used for tones, but with a different sort order *-t -x -null -p*. Consonant grapheme *y-* is re-

⁵ Syllable iteration symbol 𪛗 /w/ U+A015, even though it has no unique phonemic value, follows YI SYLLABLE E U+A014 and precedes YI SYLLABLE BIT U+A016. This placement in the DUCET is an anomaly in that every other code point from U+A000 to U+A48C represents a phonemic syllable of Sichuan Yi in standard order.

used to represent a vowel, and consonant grapheme *w-* is re-used for the syllable iteration symbol *-w*. (In the table “Re-used letters and sort behavior,” re-used letters are highlighted.)

Table 3: Re-used letters and sort behavior at different levels

Consonant (Primary)	Vowel (Secondary)	Tone (Tertiary)	Case (Quaternary)
[null]	<i>i</i>	-t	cse
<i>b</i>	<i>ie</i>	-x	Cse
p	<i>a</i>	[null]	cSe
<i>bb</i>	<i>uo</i>	-p	csE
<i>nb</i>	<i>o</i>		CSe
...	<i>e</i>		cSE
t	<i>u</i>		CsE
...	<i>ur</i>		CSE
x	y		
y	<i>yr</i>		

The standard sort for ii-Latn should produce the following sample sequences:

Graphemes: *i ie uo b dd r y*

Vowel+tone: *iep at ax a ap u urx yt y yp yrx yr*

Syllables: *ix iep bit bi by byr ddi ddap rat rax ra rap xiet xiex xie xiep yyt yy yyp yyrx yyr*

10.3.2 Yi Pinyin for dictionary index headings

In the *YYDCD* (1997), forty nine main sections⁶ are headed by the Yi Pinyin graphemes in their standard order from first vowel *I* to last consonant *Y*: [I {IE} A {UO} O E B P {BB} {NB} {HM} M F V D T {DD} {ND} {HN} N {HL} L G K {GG} {MG} {HX} {NG} H W Z C {ZZ} {NZ} S {SS} {ZH} {CH} {RR} {NR} {SH} R J Q {JJ} {NJ} {NY} X Y].

Within each main section are subsections for each syllable; subsections are sorted by their vowel+tone combinations. For example the **B** dictionary section begins with subsection 𑄑 *bit* and ends with subsection 𑄒 *byr*, as does the **B** column of the syllabary table (Table 1). This arrangement capitalizes on the user’s inherent knowledge of the Yi Pinyin graphemes and their standard order as reflected in the syllabary table. It also shows the close relationship between Sichuan Yi script and its Yi Pinyin romanization.

⁶ Vowel graphemes *u,ur,y,yr* do not begin words.

10.3.3 Yi Pinyin collation tailoring

For CLDR and ICU a collation tailoring should place Yi Pinyin index exemplars in their standard order at primary level (CLDR Collation Guidelines) (see [CLDR Collation Guidelines](#)) producing properly ordered dictionary index headings as described above. See Appendix – Collation tailoring for Latin index headings and Appendix – General collation tailoring for Yi Pinyin.

Beyond the primary level where dictionary index headings are sorted, the collation tailoring is more complicated. The tailoring should sort Yi Pinyin syllables by their vowel graphemes at secondary level, and by their tone letter at tertiary level. However, because Yi Pinyin reuses **p t w x y** and **null** (see Re-used letters and sort behavior at different levels), and because Yi Pinyin strings may be syllable-spaced or word-spaced, a collation tailoring for Yi Pinyin will not be as stable as the default collation for Yi syllables, especially when applied to polysyllabic strings.

The syllable iterator **-w**, has no fixed phonetic value, but stands for a final reduplicated syllable in strings like **bbuopluoluo** ʋ.ɕɕ → **bbuopluow** ʋ.ɕɕ. This re-use of letter **w** as both consonant **w-** and iterator **-w** does not affect index headings, but it complicates the lower levels of the Yi Pinyin collation tailoring. Tailorings presented here do not attempt to sort the syllable iterator.

10.4 Parallel properties in zh-Hans and ii-Yiii

ii-Yiii should be easier to implement in Unicode than Simplified Chinese. Where Simplified Chinese has at least 8,105 symbols (Chinese Character Table 2013) and many irregularities, ii-Yiii has only 1,220 symbols and few irregularities.

Table 4: Comparison of writing systems zh-Hans and ii-Yiii

Feature	zh-Hans	ii-Yiii
number of syllable symbols	8,105	1,165
number of primary radicals	201	26
number of secondary radicals	100	29
map symbol to romanized syllable	many-to-many	one-to-one
map romanized syllable to symbol	many-to-many	one-to-one
EOR collation as standard	yes	no
punctuation	full list	reduced list
tone as syllable-final Latin letter	no	yes
diacritics in syllable symbol	no	yes
diacritics in romanization	yes	no
digraphs in romanization	yes	yes

Table 5: ii-Yii: Differences and Adjustments from zh-Hans

Property	zh-Hans	ii-Yiii	Adjustment/Enhancement
number of symbols	8105	1165	None needed.
number of primary radicals	201	26	None needed.
number of secondary radicals (=alternate forms of primary radical)	100	29	None needed
map syllable to romanization	multiple	one-to-one	.map file exists. Add options for delimiting words or sylls
map radical to romanization	multiple	one-to-one	Some Yi radicals share a Yi Pinyin name with a Yi syllable. Yi Pinyin spelling for radicals should be differentiated from Yi Pinyin spelling for Yi syllables, to facilitate a reversible transliteration transform.
map romanization to syllables and radicals	multiple	one-to-many	For unspaced sylls, disambiguate tone letters from syll initials. Add options for delimited sylls.
diacritics in romanization	yes	no	None
digraphs in romanization	yes	yes	Use digraph graphemes as index exemplars in ii-Yiii.
tone as final roman letter	no	yes	For unspaced sylls, disambiguate tone letters from syll initials. Optionally transform tone letters to numbers for Latin sort.
diacritics in syll symbol	no	yes	Optionally define both a long and a short implementation. "Long" adds one stroke and includes mid-high sylls in R+S index and IME.
EOR collation as standard	yes	no	Use SichuanYiSources.txt to create ii-Latn collation. Add EOR as an alternate collation to ii-Latn and ii-Yiii.
punctuation	full list	reduced list	Option 1. Inherit all punctuation from CN region Option 2. Explicit list. (implemented in CLDR 43, with all punctuation identical to zh-Hans.)

11.2 Appendix – Collation tailoring for Latin index headings

```

#ii-Latn Collation Tailoring
#Index only
#This version 2024 Jan 17. Comment changes.
#
#This is a collation tailoring for Yi Pinyin (ii-Latn) index exemplars.

#
#Summary. Graphemes that must head index sections are sorted as
primary. Case variants are sorted as tertiary. This sort does not
account for tone variants.
#
#Vowel graphemes /i,ie,a,uo,o,e/ are sorted as primary so that
syllables with null initial consonant will sort first and will each
generate an index heading.
#Vowel graphemes /u,ur/ sort primary at end of vowel list to improve
vowel sort.
#Vowel grapheme /yr/ sorts primary following consonant /y/ to improve
vowel sort.
#
#Pros. Generates correct index headings. More efficient than including
vowel+tone variants. Places multisyllable forms together with
monosyllable forms of same vowel+tone.
#Cons. Handles index headings only. Not intended to sort for tone,
therefore tone sorts wrong: -null(mid-level) << -p (low) << -t (high)
<< -x (mid-high) due to primary consonant sort /null<p<t<x/. As tone
letters, they should sort /-t<<-x<<-null<<-p/.
#
#Tailoring assembled by Dennis Walters based on standard reference
materials for ii-Latn. Thanks to Martin Hosken for feedback on earlier
versions.
#BEGIN TAILORING
& i <<<I
< ie <<<iE<<<Ie<<<IE
< a <<<A
< uo <<<uO<<<Uo<<<UO
< o <<<O
< e <<<E
< u <<<U
< ur <<<uR<<<Ur<<<UR
< b <<<B
< p <<<P
< bb <<<Bb<<<BB
< nb <<<Nb<<<NB
< hm <<<Hm<<<HM
< m <<<M

```

UTC Proposal - Add Sichuan Yi Indexing

< f <<<F
< v <<<V
< d <<<D
< t <<<T
< dd <<<Dd<<<DD
< nd <<<Nd<<<ND
< hn <<<Hn<<<HN
< n <<<N
< hł <<<Hł<<<HL
< ł <<<L
< g <<<G
< k <<<K
< gg <<<Gg<<<GG
< mg <<<Mg<<<MG
< hx <<<Hx<<<HX
< ng <<<Ng<<<NG
< h <<<H
< w <<<W
< z <<<Z
< c <<<C
< zz <<<Zz<<<ZZ
< nz <<<Nz<<<NZ
< s <<<S
< ss <<<Ss<<<SS
< zh <<<Zh<<<ZH
< ch <<<Ch<<<CH
< rr <<<Rr<<<RR
< nr <<<Nr<<<NR
< sh <<<Sh<<<SH
< r <<<R
< j <<<J
< q <<<Q
< jj <<<Jj<<<JJ
< nj <<<Nj<<<NJ
< ny <<<Ny<<<NY
< x <<<X
< y <<<Y
< yr <<<yR<<<Yr<<<YR
#END TAILORING

11.3 Appendix – General collation tailoring for Yi Pinyin

```

#ii-Latn Collation Tailoring
#ToneSecondary
#This version 2023 Oct 5. Comment changes.
#
#This sort is intended to approximate the sorting sequence for Yi
Pinyin (ii-Latn) used with the standard syllabary (ii-Yiii) for Nuosu
Yi (iii).
#
#Summary. Graphemes that must head index sections are sorted as
primary. Tone variants are sorted as secondary. Case variants are
sorted as tertiary.
#
#Known issue. Although U+A015 transliterates as /w/, this sort does not
distinguish it from consonant grapheme /w/, possibly resulting in
unexpected sorting results for reduplicated syllables that have been
transliterated.
#
#Notes
#Tone sort treats vowel+tone_letter as contraction.
#
#Vowel graphemes /i,ie,a,uo,o,e/ sort primary so that
#syllables with null initial consonant come first and each generates an
index heading.
#Vowel grapheme /u/ sorts primary to distinguish it from contraction
/uo/ and to sort /u/ after /e/.
#Vowel grapheme /ur/ with its tone variants sorts primary at the end of
the vowel list
#to improve vowel sort.
#Consonant grapheme /y/ sorts primary, and is last in the sequence of
index exemplars.
#Vowel graphemes /y,yr/ with their tone variants sort secondary and
follow consonant grapheme /y/.
#Letter /w/ is used both for syllable iterator U+A015 and for consonant
grapheme /w/.
#Letters /p,t,x,null/ are each used as initial consonants and as tone
letters.
#Letter /y/ is used as initial consonant and as a vowel.
#
#Tailoring assembled by Dennis Walters based on standard reference
materials for ii-Latn.
#Thanks to Martin Hosken for feedback on earlier versions.
#
#BEGIN TAILORING
& i <<<I
<< it <<<iT<<<It<<<IT

```

UTC Proposal - Add Sichuan Yi Indexing

<< ix <<<iX<<<Ix<<<IX
<< i <<<I
<< ip <<<iP<<<Ip<<<IP
< ie <<<iE<<<Ie<<<IE
<< iet <<<iEt<<<IeT<<<IET
<< iex <<<iEX<<<IeX<<<IEX
<< ie <<<iE<<<Ie<<<IE
<< iep <<<iEP<<<IeP<<<IEP
< a <<<A
<< at <<<aT<<<At<<<AT
<< ax <<<aX<<<Ax<<<AX
<< a <<<A
<< ap <<<aP<<<Ap<<<AP
< uo <<<uO<<<Uo<<<UO
<< uot <<<uOt<<<UoT<<<UOT
<< uox <<<uOX<<<UoX<<<UOX
<< uo <<<uO<<<Uo<<<UO
<< uop <<<uOp<<<UoP<<<UOP
< o <<<O
<< ot <<<oT<<<Ot<<<OT
<< ox <<<oX<<<Ox<<<OX
<< o <<<O
<< op <<<oP<<<Op<<<OP
< e <<<E
<< et <<<eT<<<Et<<<ET
<< ex <<<eX<<<Ex<<<EX
<< e <<<E
<< ep <<<eP<<<Ep<<<EP
< u <<<U
<< ut <<<uT<<<Ut<<<UT
<< ux <<<uX<<<Ux<<<UX
<< u <<<U
<< up <<<uP<<<Up<<<UP
< ur <<<uR<<<Ur<<<UR
<< urx <<<uRx<<<Urx<<<URX
<< ur <<<uR<<<Ur<<<UR
< b <<<B
< p <<<P
< bb <<<Bb<<<BB
< nb <<<Nb<<<NB
< hm <<<Hm<<<HM
< m <<<M
< f <<<F
< v <<<V
< d <<<D
< t <<<T
< dd <<<Dd<<<DD
< nd <<<Nd<<<ND

```
< hn <<<Hn<<<HN
< n <<<N
< h| <<<H|<<<HL
< | <<<L
< g <<<G
< k <<<K
< gg <<<Gg<<<GG
< mg <<<Mg<<<MG
< hx <<<Hx<<<HX
< ng <<<Ng<<<NG
< h <<<H
< w <<<W
< z <<<Z
< c <<<C
< zz <<<Zz<<<ZZ
< nz <<<Nz<<<NZ
< s <<<S
< ss <<<Ss<<<SS
< zh <<<Zh<<<ZH
< ch <<<Ch<<<CH
< rr <<<Rr<<<RR
< nr <<<Nr<<<NR
< sh <<<Sh<<<SH
< r <<<R
< j <<<J
< q <<<Q
< jj <<<Jj<<<JJ
< nj <<<Nj<<<NJ
< ny <<<Ny<<<NY
< x <<<X
< y <<<Y
<< yt <<<yT<<<Yt<<<YT
<< yx <<<yX<<<Yx<<<YX
<< y <<<Y
<< yp <<<yP<<<Yp<<<YP
<< yrx <<<yRx<<<yRX<<<yRX<<<Yrx<<<YrX<<<YRx<<<YRX
<< yr <<<yR<<<Yr<<<YR
#END TAILORING
```

11.4 Appendix – SichuanYiRadicals.txt

```
# SichuanYiRadicals.txt
# Date: 2024 April 2
# Modeled on CJKRadicals-15.1.0.txt
#
# Mapping from Yi radical numbers to characters
#
```

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This data file provides a mapping from the Yi radical numbers used
in Yiwen Jianzi Ben (1984-2012) to the corresponding character in
the Yi Radicals block.

There is one line per Yi radical number. Each line contains two
fields, separated by a semicolon (;). The first field is the
Yi radical number. The second field is a Yi radical code point
that maps to that Yi radical number, as used
in Yiwen Jianzi Ben (1984-2012) and Yiyu Da Cidian (1997).

Yi radical numbers match the regular expression [1-2][0-9]?.

This file was created by Dennis Walters

#####

1; A490 # | QOT
2; A491 # ↓ LI
2; A492 # L KIT maps to 2 LI
3; A493 # ↑ NYIP
4; A494 # ↓ CYP
5; A495 # ↑ SSI
6; A496 # ↓ GGOP
7; A497 # ↑ GEP
7; A498 # ↓ MI maps to 7 GEP
8; A499 # ↑ HXIT
9; A49A # S LYR
9; A49B # ↑ BBUT maps to 9 LYR
10; A49C # ↷ MOP
10; A49D # C YO maps to 10 MOP
10; A49E # ⚡ PUT maps to 10 MOP
11; A49F # C HXUO
11; A4A0 #] TAT maps to 11 HXUO
12; A4A1 # ∪ GA
12; A4A2 # ^ ZUP maps to 12 GA
12; A4A3 # ∨ CYT maps to 12 GA
13; A4A4 # U DDUR
13; A4A5 # ∪ BUR maps to 13 DDUR
13; A4A6 # ∪ GGUO maps to 13 DDUR
14; A4A7 # Ω NYOP
15; A4A8 # O TU
16; A4A9 # O OP
17; A4AA # ° JJUT
17; A4AB # ^ ZOT maps to 17 JJUT
18; A4AC # † PYT
18; A4AD # † HMO maps to 18 PYT
18; A4AE # † YIT maps to 18 PYT
18; A4AF # † VUR maps to 18 PYT

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```
19; A4B0 # 𪛗 SHY
19; A4B1 # 𪛘 VEP maps to 19 SHY
19; A4B2 # 𪛙 ZA maps to 19 SHY
20; A4B3 # 𪛚 JO
20; A4B4 # 𪛛 NZUP maps to 20 JO
20; A4B5 # 𪛜 JJY maps to 20 JO
20; A4B6 # 𪛝 GOT maps to 20 JO
20; A4B7 # 𪛞 JJIE maps to 20 JO
21; A4B8 # 𪛟 WO
21; A4B9 # 𪛠 DU maps to 21 WO
21; A4BA # 𪛡 SHUR maps to 21 WO
21; A4BB # 𪛢 LIE maps to 21 WO
22; A4BC # 𪛣 CY
22; A4BD # 𪛤 CUOP maps to 22 CY
23; A4BE # 𪛥 CIP
23; A4BF # 𪛦 HXOP maps to 23 CIP
24; A4C0 # 𪛧 SHAT
24; A4C1 # 𪛨 ZUR maps to 24 SHAT
24; A4C2 # 𪛩 SHOP maps to 24 SHAT
24; A4C3 # 𪛪 CHE maps to 24 SHAT
25; A4C4 # 𪛫 ZZIET
25; A4C5 # 𪛬 NBIE maps to 25 ZZIET
26; A4C6 # 𪛭 KE
# EOF
```

11.5 Appendix - *SichuanYiRSIndex.txt*

```
# Sichuan Yi Radical-Stroke Index Collation Data
# Date: 2024-04-02, 00:00:00 GMT
# Prepared by Dennis Walters
# Modeled on RSIndex.txt unicode 16.0
#
# This data file is a "plain text" representation of the
# Sichuan Yi Radical-Stroke Index,
# whose collation order is based on the Yiwen Jianzi Ben (YWJZB)
# (1984-2012) Radical - Stroke look up index.
#
# The format is tab-delimited. The first field identifies a Yi radical
# index
# heading with a number (1-26). Its value appears in the second field
# as one or more code point(s) for the Yi radical primary and secondary
# forms.
```

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```
#
# where the first field includes a decimal and additional number (1-6),
# it is a radical.stroke value pair, which serves as a
# second level RS index heading.
#
# For example, numeral "9" in the first field is followed by two YI
RADICAL
# code points which appear in the RS index section heading as the
primary
# and secondary form of radical 9. In contrast, the string "9.0" in the
first
# field is followed by a single YI SYLLABLE code point indexed under
# Yi radical 9 with zero residual strokes.
#
# In all cases, the second field specifies one or more Unicode scalar
values
# for Yi symbols that are in collation order per YWJZB Radical +
Strokes.
# The comments provide the Yi symbols that are specified in the second
field,
# in the same collation order.
#
1      U+A490 # |
1.1    U+A489 U+A04C U+A46D U+A305 # ㄩ ㄩ ㄩ ㄩ
1.2    U+A07C U+A058 U+A455 U+A20E U+A14D U+A1B3 U+A45C U+A42C
U+A164 U+A065 U+A00A U+A0D6 U+A2EA U+A3C0 U+A018 U+A03F U+A088 U+A470 #
ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ
1.3    U+A408 U+A2F0 U+A353 U+A0CC U+A093 U+A35D U+A25B U+A3BA
U+A1D4 U+A278 U+A429 U+A139 U+A100 U+A41A U+A3A7 U+A080 U+A397 U+A45B
U+A020 U+A01E U+A3CC U+A3A8 U+A303 U+A14E # ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ
1.4    U+A228 U+A00D U+A406 U+A021 U+A0DA U+A28D U+A13C U+A237
U+A1A0 U+A067 U+A3D9 U+A0D7 # ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ
1.5    U+A1BF U+A340 U+A13B U+A0FF U+A292 U+A48C # ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ
1.6    U+A3D4 U+A0E8 # ㄩ ㄩ
2      U+A491 U+A492 # ㄩ ㄩ
2.1    U+A1B9 U+A1BE U+A224 U+A02E U+A433 U+A431 # ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ ㄩ
```


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- 2.2 U+A26C U+A10C U+A460 U+A210 U+A213 U+A114 U+A40F U+A120
U+A0C5 U+A3BC U+A0F0 U+A26A U+A30E U+A34C U+A2E1 U+A216 U+A21E U+A0C2
U+A0E6 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 2.3 U+A1BB U+A24A U+A063 U+A153 U+A1F8 U+A11C U+A0C8 U+A1EC
U+A0AA U+A0C3 U+A309 U+A310 U+A263 U+A06B U+A402 U+A320 U+A1A6 U+A15A
U+A2A4 U+A096 U+A045 U+A404 U+A484 U+A29A # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 2.4 U+A0A5 U+A12E U+A37F U+A380 U+A128 U+A0D1 U+A3AE U+A450 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 2.5 U+A312 U+A323 U+A17F # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 2.6 U+A379 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3 U+A493 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3.1 U+A44D U+A2B0 U+A209 U+A1C1 U+A26E U+A218 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3.2 U+A315 U+A316 U+A30C U+A25C U+A277 U+A09B U+A119 U+A16A
U+A12F U+A0BF U+A363 U+A361 U+A34B U+A34D U+A16B U+A3C6 U+A3F6 U+A28C
U+A1C5 U+A2E3 U+A006 U+A2B5 U+A2AE U+A469 U+A338 U+A27E U+A388 U+A3CB
U+A2B2 U+A231 U+A391 U+A357 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3.3 U+A44C U+A168 U+A275 U+A31C U+A0D8 U+A3AD U+A2E6 U+A2FD
U+A293 U+A16C U+A43A U+A425 U+A0B5 U+A234 U+A34F U+A46A U+A035 U+A37D
U+A286 U+A079 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3.4 U+A144 U+A0FA U+A28B U+A3B8 U+A3B9 U+A053 U+A3A1 U+A2A0
U+A365 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3.5 U+A076 U+A2F7 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 3.6 U+A430 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4 U+A494 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4.0 U+A2CD # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4.1 U+A1F0 U+A258 U+A33A U+A188 U+A110 U+A1C9 U+A222 U+A034
U+A270 U+A2BB # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4.2 U+A18F U+A138 U+A47D U+A250 U+A0CF U+A161 U+A04D U+A075
U+A091 U+A074 U+A474 U+A129 U+A183 U+A3AA U+A486 U+A0ED U+A112 U+A11F
U+A11A U+A36C U+A00B U+A2F4 U+A1B4 U+A447 U+A205 U+A0F4 U+A3DD U+A457
U+A191 U+A014 U+A032 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4.3 U+A194 U+A193 U+A0FD U+A478 U+A0BB U+A47B U+A35A U+A367
U+A25E U+A2F6 U+A2ED U+A072 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4.4 U+A251 U+A229 U+A319 U+A208 U+A204 U+A196 U+A479 U+A135
U+A2E4 U+A098 U+A369 U+A156 U+A25F # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 4.5 U+A226 U+A3E4 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 5 U+A495 # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿
- 5.1 U+A008 U+A11D U+A172 U+A22A U+A1FD U+A2FB # 𪛙𪛚𪛛𪛜𪛝𪛞𪛟𪛠𪛡𪛢𪛣𪛤𪛥𪛦𪛧𪛨𪛩𪛪𪛫𪛬𪛭𪛮𪛯𪛰𪛱𪛲𪛳𪛴𪛵𪛶𪛷𪛸𪛹𪛺𪛻𪛼𪛽𪛾𪛿

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- 5.2 U+A1DD U+A477 U+A097 U+A0DD U+A3FB U+A2E9 U+A1B7 U+A06E
U+A271 U+A19D U+A32C U+A019 U+A2A1 U+A0C9 U+A0F1 U+A0F7 # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 5.3 U+A206 U+A170 U+A384 U+A351 U+A393 U+A335 U+A2DD U+A423
U+A39B # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 5.4 U+A2D3 U+A3DC U+A32D U+A294 U+A37B U+A1E1 # 𠄎𠄎𠄎𠄎𠄎𠄎
- 5.5 U+A147 U+A32A # 𠄎𠄎
- 6 U+A496 # 𠄎
- 6.1 U+A390 U+A225 U+A3C3 U+A262 # 𠄎𠄎𠄎𠄎
- 6.2 U+A44A U+A16E U+A446 U+A327 U+A3A5 U+A15B U+A21D U+A1CC
U+A15D U+A21A U+A235 U+A39D U+A29D U+A0E0 U+A09D U+A0DE # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 6.3 U+A127 U+A38E U+A33C # 𠄎𠄎𠄎𠄎
- 6.4 U+A15E U+A33F U+A3B6 U+A3E6 # 𠄎𠄎𠄎𠄎𠄎
- 6.6 U+A0AB # 𠄎
- 7 U+A497 U+A498 # 𠄎𠄎
- 7.1 U+A1F1 U+A102 U+A10F U+A0B0 # 𠄎𠄎𠄎𠄎
- 7.2 U+A1AB U+A06F U+A190 U+A18D U+A0D0 U+A159 U+A1EE U+A157
U+A2C7 U+A449 U+A185 U+A342 U+A1B6 U+A0B1 U+A0B4 U+A09E U+A481 U+A08E
U+A443 # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 7.3 U+A186 U+A12B U+A202 U+A1C2 U+A178 U+A17C U+A176 U+A33E
U+A376 U+A16F # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 7.4 U+A18C # 𠄎
- 8 U+A499 # 𠄎
- 8.1 U+A246 U+A1D7 U+A09A # 𠄎𠄎𠄎
- 8.2 U+A3E2 U+A219 U+A1D6 U+A1CD U+A282 U+A283 U+A071 U+A378
U+A113 U+A387 U+A36B U+A35E # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 8.3 U+A2D7 U+A136 U+A3B1 U+A0D3 U+A2D0 U+A0E5 U+A06A # 𠄎𠄎𠄎𠄎𠄎𠄎𠄎
- 8.4 U+A151 U+A0D4 U+A32F U+A42D U+A330 # 𠄎𠄎𠄎𠄎𠄎
- 8.6 U+A348 # 𠄎
- 9 U+A49A U+A49B # 𠄎
- 9.0 U+A1D9 # 𠄎
- 9.1 U+A0A2 # 𠄎
- 9.2 U+A317 U+A444 U+A35B U+A3DA # 𠄎𠄎𠄎𠄎
- 9.3 U+A21C # 𠄎
- 9.4 U+A31A U+A31D U+A06C U+A2A8 U+A3E3 # 𠄎𠄎𠄎𠄎

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10 U+A49C U+A49D U+A49E # ㄩㄨㄩ
10.0 U+A0C0 U+A04A # ㄩㄨ
10.1 U+A1DC U+A1A1 U+A290 U+A47F U+A3F3 U+A313 U+A39A # ㄩㄨㄩㄩㄩㄩㄩ
10.2 U+A399 U+A1DA U+A2B9 U+A085 U+A081 U+A349 U+A375 # ㄩㄨㄨㄩㄩㄩㄩ
10.3 U+A473 U+A383 U+A023 U+A47C U+A1C3 # ㄩㄨㄩㄩㄩ
10.5 U+A343 # ㄩ
11 U+A49F U+A4A0 # ㄩ
11.0 U+A254 # ㄩ
11.1 U+A02F U+A3F2 U+A0E4 U+A24C U+A267 U+A121 U+A386 U+A256
U+A3F8 # ㄩㄩㄩㄩㄩㄩㄩ
11.2 U+A105 U+A149 U+A43E U+A38D U+A426 U+A3D7 U+A3F9 U+A360
U+A3B2 U+A441 U+A05D # ㄩㄩㄩㄩㄩㄩㄩㄩ
11.3 U+A440 U+A242 U+A0F6 U+A3E7 U+A1A3 U+A17A U+A124 U+A1FF
U+A285 U+A05C # ㄩㄩㄩㄩㄩㄩㄩㄩ
11.4 U+A3C5 U+A451 U+A44E U+A05E U+A17B U+A38B U+A049 # ㄩㄩㄩㄩㄩㄩ
11.5 U+A044 U+A23E U+A421 # ㄩㄩㄩ
12 U+A4A1 U+A4A2 U+A4A3 # ㄩㄩ
12.1 U+A329 U+A326 U+A414 U+A1E4 U+A211 U+A2CA # ㄩㄩㄩㄩㄩ
12.2 U+A0CB U+A324 U+A46E U+A0E2 U+A415 U+A480 U+A1E0 U+A1B1
U+A3EA U+A3EF U+A20A U+A31E U+A252 U+A255 U+A422 U+A0E1 # ㄩㄩㄩㄩㄩㄩㄩㄩㄩ
ㄩㄩㄩ
12.3 U+A0A8 U+A20D U+A0FC U+A048 U+A41C U+A46B U+A243 U+A197
U+A199 U+A483 U+A2DE U+A1E2 U+A297 U+A28F U+A2A5 U+A3E0 U+A1DE # ㄩㄩㄩㄩㄩㄩ
ㄩㄩㄩㄩㄩㄩㄩㄩ
12.4 U+A41F U+A418 U+A487 U+A2F9 U+A3B4 # ㄩㄩㄩㄩㄩ
12.5 U+A146 U+A1C7 U+A3A2 U+A454 # ㄩㄩㄩㄩ
13 U+A4A4 U+A4A5 U+A4A6 # ㄩㄩ
13.1 U+A1F4 U+A150 U+A3F5 U+A245 U+A260 U+A434 U+A0EE U+A0EC
U+A2EC U+A220 U+A2F3 # ㄩㄩㄩㄩㄩㄩㄩㄩ
13.2 U+A000 U+A002 U+A302 U+A041 U+A042 U+A1C6 U+A2BD U+A280
U+A031 U+A41E # ㄩㄩㄩㄩㄩㄩㄩㄩ
13.3 U+A308 U+A407 U+A1F7 U+A107 U+A0B9 # ㄩㄩㄩㄩ
13.4 U+A240 U+A2F2 # ㄩ
13.5 U+A354 U+A08D # ㄩ
14 U+A4A7 # ㄩ
14.0 U+A458 # ㄩ

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- 14.1 U+A154 U+A1FA # 𐑁𐑂
- 14.2 U+A382 # 𐑃
- 14.3 U+A1CA # 𐑄
- 14.4 U+A07D U+A0CD # 𐑅𐑆
- 15 U+A4A8 # 𐑇
- 15.0 U+A132 # 𐑈
- 15.1 U+A3FF U+A1AA U+A40E U+A27B U+A2B8 U+A2C2 U+A1A9 # 𐑉𐑊𐑋𐑌𐑍
- 15.2 U+A411 U+A0EA U+A337 U+A1BA U+A459 U+A1E5 U+A1F5 U+A3F0
U+A33B U+A2B6 # 𐑎𐑏𐑐𐑑𐑒𐑓𐑔𐑕
- 15.3 U+A1CE U+A40B U+A394 U+A027 U+A0AE U+A0B3 # 𐑖𐑗𐑘𐑙
- 15.4 U+A1E9 U+A306 U+A094 # 𐑚𐑛
- 15.5 U+A0A6 # 𐑜
- 16 U+A4A9 # 𐑝
- 16.1 U+A0B7 U+A1A7 U+A19E U+A321 U+A012 U+A182 U+A03A U+A01C
U+A2B4 U+A3CF U+A3C9 U+A01D U+A10D # 𐑞𐑟𐑠𐑡𐑢𐑣𐑤𐑥𐑦𐑧𐑨
- 16.2 U+A1B0 U+A059 U+A232 U+A004 U+A1A4 U+A19A U+A175 U+A269
U+A2BC U+A2BF U+A299 U+A189 U+A011 U+A355 U+A3D3 U+A016 U+A2C9 U+A2A2
U+A39F U+A23F U+A3EB U+A130 U+A01A # 𐑩𐑪𐑫𐑬𐑭𐑮𐑯𐑰𐑱𐑲𐑳𐑴𐑵𐑶𐑷𐑸𐑹
- 16.3 U+A40C U+A24D U+A03D U+A18A U+A3C8 U+A007 U+A364 U+A2E0
U+A437 U+A3E8 U+A2C4 U+A046 U+A087 U+A466 U+A056 # 𐑺𐑻𐑼𐑽𐑾𐑿𐒀𐒁𐒂𐒃𐒄𐒅𐒆𐒇𐒈𐒉𐒊
- 16.4 U+A064 U+A30B U+A27F U+A08A U+A1F2 U+A0BC U+A04F U+A40A
U+A08B U+A26D # 𐒋𐒌𐒍𐒎𐒏𐒐𐒑𐒒𐒓𐒔𐒕𐒖𐒗𐒘𐒙𐒚𐒛
- 16.5 U+A396 U+A372 U+A346 U+A373 # 𐒜𐒝𐒞𐒟
- 17 U+A4AA U+A4AB # 𐒠𐒡
- 17.1 U+A22F U+A3A4 U+A427 U+A3BD U+A00F U+A29B # 𐒢𐒣𐒤𐒥𐒦𐒧𐒨
- 17.2 U+A02C U+A117 U+A23B U+A358 U+A453 U+A03E U+A29E U+A00E
U+A238 U+A05A # 𐒩𐒪𐒫𐒬𐒭𐒮𐒯𐒰𐒱𐒲𐒳𐒴𐒵
- 17.3 U+A165 U+A3D2 U+A133 U+A19C U+A334 U+A1AE U+A274 U+A239
U+A078 # 𐒶𐒷𐒸𐒹𐒺𐒻𐒼𐒽𐒾𐒿
- 17.4 U+A38A U+A167 U+A333 U+A273 U+A221 # 𐓀𐓁𐓂𐓃𐓄
- 17.5 U+A0AD U+A438 # 𐓅𐓆
- 18 U+A4AC U+A4AD U+A4AE U+A4AF # 𐓇𐓈𐓉
- 18.0 U+A050 # 𐓊
- 18.1 U+A0BD U+A09F U+A180 U+A003 U+A160 # 𐓋𐓌𐓍𐓎
- 18.2 U+A055 U+A2D2 U+A038 U+A41B U+A14A U+A39E U+A3FC U+A24E
U+A471 U+A475 U+A0F9 # 𐓏𐓐𐓑𐓒𐓓𐓔𐓕𐓖𐓗𐓘𐓙𐓚𐓛

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18.3 U+A0A1 # 𑄁

18.4 U+A17D # 𑄂

18.5 U+A037 # 𑄃

19 U+A4B0 U+A4B1 U+A4B2 # 𑄄 𑄅 𑄆

19.0 U+A3C2 # 𑄇

19.1 U+A279 U+A48A U+A0F3 U+A3DF # 𑄈 𑄉 𑄊 𑄋

19.2 U+A23C U+A1AD U+A296 U+A214 # 𑄌 𑄍 𑄎 𑄏

19.3 U+A025 U+A42A U+A2AB U+A125 # 𑄐 𑄑 𑄒 𑄓

19.4 U+A2AD U+A12C # 𑄔 𑄕

20 U+A4B3 U+A4B6 U+A4B4 U+A4B7 U+A4B5 # 𑄖 𑄗 𑄘 𑄙 𑄚

20.1 U+A3EE # 𑄛

20.2 U+A061 U+A1D0 U+A084 U+A3EC U+A45D U+A463 U+A461 U+A42F
U+A02A # 𑄜 𑄝 𑄞 𑄟 𑄠 𑄡 𑄢 𑄣

20.3 U+A0B8 U+A083 U+A2C3 U+A467 U+A103 U+A068 # 𑄤 𑄥 𑄦 𑄧 𑄨 𑄩

20.4 U+A435 U+A331 U+A2FF U+A1EA U+A345 # 𑄪 𑄫 𑄬 𑄭 𑄮

20.5 U+A300 # 𑄯

21 U+A4B8 U+A4BA U+A4B9 U+A4BB # 𑄰 𑄱 𑄲 𑄳

21.0 U+A3BF # 𑄴

21.1 U+A0C6 U+A1BD U+A30F # 𑄵 𑄶 𑄷

21.2 U+A288 # 𑄸

21.3 U+A116 # 𑄹

22 U+A4BC U+A4BD # 𑄺 𑄻

22.1 U+A2CC U+A27C U+A45F U+A2AA U+A106 U+A2BC # 𑄼 𑄽 𑄾 𑄿 𑅀 𑅁

22.2 U+A3FE U+A289 U+A07F U+A03B U+A162 U+A1D3 U+A1D1 U+A2CF
U+A264 U+A3CD U+A3D0 # 𑅂 𑅃 𑅄 𑅅 𑅆 𑅇 𑅈 𑅉 𑅊 𑅋

22.3 U+A2DB U+A403 U+A464 U+A350 # 𑅌 𑅍 𑅎 𑅏

22.4 U+A2DA # 𑅐

23 U+A4BE U+A4BF # 𑅒 𑅓

23.0 U+A2B1 U+A259 # 𑅔 𑅕

23.1 U+A0A3 U+A052 U+A1FE U+A43D # 𑅖 𑅗 𑅘 𑅙

23.2 U+A1FB U+A14B U+A248 U+A090 # 𑅚 𑅛 𑅜 𑅝

23.3 U+A400 U+A43B U+A417 # 𑅞 𑅟 𑅠

24 U+A4C0 U+A4C1 U+A4C2 U+A4C3 # 𑅢 𑅣 𑅤 𑅥

24.0 U+A3AB U+A3B5 # 𑅦 𑅧

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24.1 U+A201 U+A109 U+A10A U+A412 U+A1E6 U+A173 # 𠄎𠄎𠄎𠄎𠄎
24.2 U+A22C U+A060 U+A22D U+A1E8 U+A2A7 U+A36F U+A370 U+A266 # 𠄎𠄎
𠄎𠄎𠄎𠄎𠄎
24.3 U+A368 U+A2C6 U+A36D # 𠄎𠄎𠄎
25 U+A4C4 U+A4C5 # 𠄎𠄎
25.1 U+A024 U+A142 U+A249 # 𠄎𠄎𠄎
25.2 U+A143 U+A13D U+A07B # 𠄎𠄎𠄎
25.3 U+A3B0 U+A0E9 U+A3D6 U+A2D6 U+A02B # 𠄎𠄎𠄎𠄎𠄎
25.4 U+A028 U+A13F U+A140 # 𠄎𠄎𠄎
25.5 U+A2D8 # 𠄎
25.6 U+A2D4 # 𠄎
26 U+A4C6 # 𠄎
26.1 U+A20C # 𠄎
26.2 U+A1ED # 𠄎
26.3 U+A2EF U+A123 U+A0DB # 𠄎𠄎𠄎
26.4 U+A2E7 # 𠄎
End of Sichuan Yi Radical-Stroke sort

11.6 Appendix – RS test lines from Sichuan Yi section of *FractionalUCA.txt*

```
# Fractional UCA For Radical-Stroke sort for Sichuan Yi
# 2024 February 7
# Prepared by Dennis Walters
# This content would normally be generated from the UCA DUCET
# but this has been manually assembled
# to show what the automatically generated content would look
# like for the lines that place Yi characters in their
# radical sections. This version follows YWJZB exactly. An
# alternate version would sort by DUCET within RS bins.
#
# Based on FractionalUCA.txt
# Fractional UCA Table, generated from the UCA DUCET
```


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