TIPA Version 1.1 Manual

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Contents

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1 What's new?

The following changes have been made since the first release of TIPA[1].

- A few new typefaces, Bold Extended Slanted, Sans Serif Bold Extended, Sans Serif Slanted, Typewriter Text, Typewriter Text Slanted added, and `*.fd` files modified accordingly.

  Roman: [ˌɛkspləˈneɪʃən]
  Bold Extended Roman: [ˌɛkspləˈneɪʃən]
  (New) Bold Extended Slanted Roman: [ˌɛkspləˈneɪʃən]
  Sans Serif: [ˌɛkspləˈneɪʃən]
  (New) Sans Serif Bold Extended: **[ˌɛkspləˈneɪʃən]**
  (New) Sans Serif Slanted: [ˌɛkspləˈneɪʃən]
  (New) Typewriter Text: [ˌɛksplə ˈneɪʃən]
  (New) Typewriter Text Slanted: [ˌɛksplə ˈneɪʃən]

- Many bugs fixed in the METAFONT source codes; I touched upon almost every symbol. The `xipa` familiy of fonts now more closely simulates Times Roman style.

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[1]The first release of TIPA has been known by the release name 'beta0624'. I originally intended to change it something like 'tipa-1.0' soon after that release but unfortunately I didn't have opportunity to do so.

- `t3enc.def` and `tipa.sty` modified.

- New series of fonts, **tipx** and **xipx** have been created. These fonts are collections of symbols missing in the previous version of TIPA and cover almost all the symbols that appear in the second edition of *PSG* (1996). (Remember that TIPA was released in 1996 and at the time the second edition of *PSG* was not available.) Some of the symbols included in the previous version of TIPA are now moved into **tipx** and **xipx**. Thus the T3 encoding is slightly modified.

  In order to use newly created fonts, add the following after the declaration of TIPA.

  `\usepackage{tipx}`

  For a list of newly created symbols, see Appendix B.1.

  The encoding of `tipx` and `xipx` has still no definite name and the style file (`tipx.sty`) uses the U encoding and new family names (tipx and xipx; this is arbitrary). In the future, it may be possible to use a new encoding name TS3 (I experimentally put `ts3enc.def` and `ts3*.fd` in the `sty` directory of the package. Use these files at your own risk, if the system doesn't complain.)

- Some new tone letter commands, `\stone` and `\rtone`.

- Manual updated.

- Manual for the `vowel.sty` completed.

2 Introduction

TIPA[2] is a system for processing IPA (International Phonetic Alphabet) symbols in LATEX. It is based on TSIPA[3] but both METAFONT source codes and LATEX macros have been thoroughly rewritten so that it can be considered as a new system.

Among many features of TIPA, the following are the new features as compared with TSIPA or any other existing systems for processing IPA symbols.

- A new 256 character encoding for phonetic symbols ('T3'), which includes all the symbols and diacritics found in the recent versions of IPA and some non-IPA symbols.

- Complete support of LATEX 2_ε.

- Roman, slanted, bold, bold extended and sans serif font styles.

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[2]TIPA stands for *TEX IPA* or *Tokyo IPA*. The primary ftp site in which the latest version of TIPA is placed is `ftp://tooyoo.L.u-tokyo.ac.jp/pub/TeX/tipa`, and also it is mirrored onto the directory `fonts/tipa` of the CTAN archives.

[3]TSIPA was made in 1992 by Kobayashi Hajime, Fukui Rei and Shirakawa Shun. It is available from a CTAN archive.

One problem with TSIPA was that symbols already included in `OT1`, `T1` or Math fonts are excluded, because of the limitation of its 128 character encoding. As a result, a string of phonetic representation had to be often composed of symbols from different fonts, disabling the possibility of automatic inter-word kerning. And also too many symbols had to be realized as macros.

- Easy input method in the IPA environment.
- Extended macros for accents and diacritics.[4]
- A flexible system of macros for 'tone letters'.
- An optional package (`vowel.sty`) for drawing vowel diagrams.[5]
- A slightly modified set of fonts that go well when used with Times Roman and Helvetica fonts.

3   TIPA Encoding

3.1   Selection of symbols

The selection of TIPA phonetic symbols[6] was made based on the following works.

- *Phonetic Symbol Guide* [10] (henceforth abbreviated as *PSG*).
- *Handbook of the International Phonetic Association* [9] (henceforth abbreviated as *Handbook*).
- The official IPA charts of '49, '79, '89, '93 and '96 versions.
- Recent articles published in the *JIPA*[7], such as "Report on the 1989 Kiel Convention" [6], "Further report on the 1989 Kiel Convention" [7], "Computer Codes for Phonetic Symbols" [3], "Council actions on revisions of the IPA" [8], etc.
- An unpublished paper by J. C. Wells: "Computer-coding the IPA: a proposed extension of SAMPA" [11].
- Popular textbooks on phonetics.

More specifically, TIPA contains all the symbols, including diacritics, defined in the '79, '89, '93 and '96 versions of IPA. And in the case of the '49 version of IPA, which is described in the *Principles* [5], there are too many obsolete symbols and only those symbols that had had some popularity at least for some time or for some group of people are included.

Besides IPA symbols, TIPA also contains symbols that are useful for the following areas of phonetics and linguistics.

- Symbols used in the American phonetics (e.g., æ, ɛ, ɷ, λ, etc.).
- Symbols used in the historical study of Indo-European languages (e.g., þ, ƥ, ɧ, ᶎ, ь, ъ, and accents such as á, ĕ, etc.).
- Symbols used in the phonetic description of languages in East Asia (e.g., ɿ, ʅ, ɖ, ɳ, ʈ, etc.).
- Diacritics used in 'extIPA Symbols for Disordered Speech' [4] and 'VoQS (Voice Quality Symbols)' [1] (e.g., n̪, f̬, m̋, etc).

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[4]These macros are now defined in a separate file called '`exaccent.sty`' in order for the authors of other packages to be able to make use of them. The idea of separating these macros from other ones was suggested by Frank Mittelbach.

[5]This package (`vowel.sty`) can be used independently from the TIPA package. Documentation is also made separately in '`vowel.tex`' so that no further mention will be made here.

[6]In the case of TSIPA, the selection of symbols was based on "Computer coding of the IPA: Supplementary Report" [2].

[7]*Journal of the International Phonetic Association.*

It should be also noted that TIPA includes all the necessary elements of 'tone letters', enabling all the theoretically possible combinations of the tone letter system. In the recent publication of the International Phonetic Association tone letters are admitted as an official way of representing tones but the treatment of tone letters is quite insufficient in that only a limited number of combination is allowed. This is apparently due to the fact that there has been no 'portable' way of combining symbols that can be used across various computer environments. Therefore TeX's productive system of macro is an ideal tool for handling a system like tone letters.

In the process of writing METAFONT source codes for TIPA phonetic symbols there have been many problems besides the one with the selection of symbols. One of such problems was that sometimes the exact shape of a symbol was unclear. For example, the shapes of the symbols such as ɕ (Stretched C), ʝ (Curly-tail J) differ according to sources. This is partly due to the fact that the IPA has been continuously revised for the past few decades, and partly due to the fact that different ways of computerizing phonetic symbols on different systems have resulted in the diversity of the shapes of phonetic symbols.

Although there is no definite answer to such a problem yet, it seems to me that it is a privilege of those working with METAFONT to have a systematic way of controlling the shapes of phonetic symbols.

3.2   Encoding

The 256 character encoding of TIPA is now officially called the 'T3' encoding.[8] In deciding this new encoding, care is taken to harmonize with existing other encodings, especially with the T1 encoding. Also the easiness of inputting phonetic symbols is taken into consideration in such a way that frequently used symbols can be input with small number of keystrokes.

Table 1 shows the layout of the T3 encoding.

The basic structure of the encoding found in the first half of the table (character codes '000–'177) is based on normal text encodings (ASCII, OT1 and T1) in that sectioning of this area into several groups such as the section for accents and diacritics, the section for punctuation marks, the section for numerals, the sections for uppercase and lowercase letters is basically the same with these encodings.

Note also that the T3 encoding contains not only phonetic symbols but also usual punctuation marks that are used with phonetic symbols, and in such cases the same codes are assigned as the normal text encodings. However it is a matter of trade-off to decide which punctuation marks are to be included. For example ':' and ';' might have been preserved in T3 but in this case ':' has been traditionally used as a substitute for the length mark 'ː' so that I decided to exclude ':' in favor of the easiness of inputting the length mark by a single keystroke.

The encoding of the section for accents and diacritics is closely related to T1 in that the accents commonly included in T1 and T3 have the same encoding.

The sections for numerals and uppercase letters are filled with phonetic symbols that are used frequently in many languages, because numerals and

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[8]In a discussion with the LaTeX 2ε team it was suggested that the 128 character encoding used in WSUIPA would be refered to as the OT3 encoding.

	'0	'1	'2	'3	'4	'5	'6	'7
'00x								
	Accents and diacritics							
'04x								
'05x	Punctuation marks							
'06x	Basic IPA symbols I (vowels)							
'07x			Diacritics, etc.					
'10x								
	Basic IPA symbols II							
'13x				Diacritics, etc.				
'14x	Punct.	Basic IPA symbols III (lowercase letters)						
'17x							Diacritics	
'20x								
	Tone letters and other suprasegmentals							
'23x								
'24x								
	Old IPA, non-IPA symbols							
'27x								
'30x								
	Extended IPA symbols							
'33x							Germanic	
'34x								
	Basic IPA symbols IV							
'37x							Germanic	

Table 1: Layout of the `T3` encoding

uppercase letters are usually not used as phonetic symbols. And the assignments made here are used as the 'shortcut characters', which will be explained in the section entitled "Ordinary phonetic symbols" (section 7.1).

As for the section for uppercase letters in the usual text encoding, a series of discussion among the members of the `ling-tex` mailing list revealed that there seem to be a certain amount of consensus on what symbols are to be assigned to each code. For example they were almost unanimous for the assignments such as ɑ for A, β for B, ð for D, ʃ for S, θ for T, etc. For more details, see table 2.

The encoding of the section for numerals was more difficult than the above case. One of the possibilities was to assign symbols based on the resemblance of shapes. One can easily think of assignments such as ɜ for 3 ɓ for 6, etc. But the resemblance of shape alone does not serve as a criteria for all the assignments. So I decided to assign basic vowel symbols to this section.[9] Fortunately the resemblance of shape is to some extent maintained as is shown in table 2.

The encoding of the section for lowercase letters poses no problem since they are all used as phonetic symbols. Only one symbol, namely 'g', needs some attention because its shape should be 'ɡ', rather than 'g', as a phonetic

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[9]This idea was influenced by the above mentioned article by J. C. Wells [11].

ASCII	:	;	"							
TIPA	ː	ˌ	ˈ							
ASCII	0	1	2	3	4	5	6	7	8	9
TIPA	ʉ	ɨ	ʌ	ɜ	ɥ	ʁ	ɒ	ɤ	θ	ə
ASCII	@	A	B	C	D	E	F	G	H	I
TIPA	ə	ɑ	β	ç	ð	ɛ	ɸ	ɣ	ɦ	ɪ
ASCII	J	K	L	M	N	O	P	Q	R	S
TIPA	ɟ	ʁ	ʎ	ɱ	ŋ	ɔ	ʔ	ʕ	ɾ	ʃ
ASCII	T	U	V	W	X	Y	Z	|		
TIPA	θ	ʊ	ʋ	ɰ	χ	ʏ	ʒ	|		

Table 2: TIPA shortcut characters

symbol.[10]

The second half of the table (character codes '200-'377) is divided into four sections. The first section is devoted to the elements of tone letters and other suprasegmental symbols.

Among the remaining three sections the last section '340-'377 contains more basic symbols than the other two sections. This is a result of assigning the same character codes as latin-1 (ISO8859-1) and T1 encodings to the symbols that are commonly included in TIPA, latin-1 and T1 encoded fonts.[11] These are the cases of æ, ø, œ, ç and þ. And within each section symbols are arraneged largely in alphabetical order.

For a table of the T3 encoding, see Appendix C (section E).

4 Installation

4.1 Basics

In a CTAN site or any other sites that have a copy of the TIPA package, the directory structure of TIPA looks like as follows.

    sty — containing *.sty, *.fd, *.def files.
    mf — containing METAFONT source files.
    tfm — containing font metric files.
    doc — containing document files.
    dvips — containing tipa.map file.
    type1 — containing PostScript type1 fonts.

If you are using a recent set of LaTeX2e distribution, all you need to do is, basically, only two things.

- Copy all the files in the sty directory into an appropriate place.

- Copy all the files in the mf directory into an appropriate place.

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[10]But the alternative shape 'g' is preserved in other section and can be used as \textg.
[11]This is based on a suggestion by Jörg Knappen.

In the case of a popular Unix-like OS, the actual installation procedure will look like the following.

(`$texmf` stands for your TeX system directory; `/usr/local/share/texmf`, for example).

> `mkdir $texmf/tex/latex/tipa` — create a directory for style files.
> `cp sty/* $texmf/tex/latex/tipa` — copy all the files in `sty`.
> `mkdir $texmf/fonts/source/fkr` — create a directory for
> `mkdir $texmf/fonts/source/fkr/tipa`   mf files.
> `cp mf/* $texmf/fonts/source/fkr/tipa` — copy all the `mf` files.
> `mktexlsr` — update the kpathsea database.

If you are using Windows or Mac, follow the equivalent steps: i.e., create a directory/folder for style files and copy the contents of the TIPA `sty` directory/folder, and, create a directory/folder for METAFONT source files and copy the contents of the TIPA `mf` directory/folder.

If you are going to run TIPA on the basis of `pk` files, all other things, `tfm` files and `pk` files will be generated automatically. So, that's all for the installation.

You may optionally copy all the `tfm` files into an appropriate directory which TeX and device driver programs can find. This will save time for the automatic font generation.

> `mkdir $texmf/fonts/tfm/fkr`
> `mkdir $texmf/fonts/tfm/fkr/tipa`
> `cp tfm/* $texmf/fonts/tfm/fkr/tipa`

If your TeX system is not equiped with the automatic font generation mechanism, you may have to create and install `pk` files by yourself. For example:

> (generate pk font files; please ask someone how to do.)
> `mkdir $texmf/fonts/pk/ljfour/fkr`
> `mkdir $texmf/fonts/pk/ljfour/fkr/tipa`
> `cp *pk $texmf/fonts/pk/ljfour/fkr/tipa`

4.2   Installing Type1 fonts

First, install the contents of the directories `dvips` and `type1` onto appropriate directories. For example:

> `cp dvips/tipa.map $texmf/dvips/config`
> `mkdir $texmf/fonts/type1/fkr`
> `mkdir $texmf/fonts/type1/fkr/tipa`
> `cp type1/* $texmf/fonts/type1/fkr/tipa`
> `mktexlsr` — update the kpathsea database.

And then, edit config files for your device driver. In the case of `dvips`, edit `config.ps` and/or `config.pdf`, for example, and insert a line containing:

> `p +tipa.map`

5   TIPA fonts

This version of TIPA includes two families of IPA fonts, `tipa` and `xipa`. The former family of fonts is for normal use with LaTeX, and the latter family is intended to be used with '`times.sty`'(PSNFSS). They all have the same `T3` encoding as explained in the previous section.

- `tipa`

  Roman: `tipa8`, `tipa9`, `tipa10`, `tipa12`, `tipa17`
  Slanted: `tipasl8`, `tipasl9`, `tipasl10`, `tipasl12`
  Bold extended: `tipabx8`, `tipabx9`, `tipabx10`, `tipabx12`
  Bold extended Slanted: `tipabs10`
  Sans serif: `tipass8`, `tipass9`, `tipass10`, `tipass12`, `tipass17`
  Sans serif Bold extended: `tipasb10`
  Sans serif Slanted: `tipasi10`
  Bold: `tipab10`
  Typewriter Text: `tipatt8`, `tipatt9`, `tipatt10`, `tipatt12`
  Typewriter Text Slanted: `tipats10`

- `xipa`

  Roman: `xipa10`
  Slanted: `xipasl10`
  Bold: `xipab10`
  Bold Slanted: `xipabs10`
  Sans serif Bold: `xipasb10`
  Sans serif Slanted: `xipasi10`

All these fonts are made by METAFONT, based on the Computer Modern font series. In the case of the `xipa` series, parameters are adjusted so as to look fine when used with Times Roman (in the cases of `xipa10`, `xipasl10`, `xipab10`) and Helvetica (in the case of `xipass10`).

6   Usage

6.1   Declaration of TIPA package

In order to use TIPA, first declare `tipa.sty` package at the preamble of a document.

```
\documentclass{article}
\usepackage{tipa}
```

If you want to use additional set of phonetic symbols, declare `tipx.sty` after the declaration of `tipa.sty`.

```
\documentclass{article}
\usepackage{tipa}
\usepackage{tipx}
```

6.2 Encoding options

The above declaration uses `OT1` as the default text encoding. If you want to use TIPA symbols with `T1`, specify the option 'T1'.

```
\documentclass{article}
\usepackage[T1]{tipa}
```

If you want to use a more complex form of encoding, declare the use of `fontenc` package by yourself and specify the option 'noenc'. In this case the option 'T3', which represents the TIPA encoding, must be included as an option to the `fontenc` package. For example, if you want to use TIPA and the University Washington Cyrillic (`OT2`) with the `T1` text encoding, the following command will do this.

```
\documentclass{article}
\usepackage[T3,OT2,T1]{fontenc}
\usepackage[noenc]{tipa}
```

By default, TIPA includes the `fontenc` package internally but the option `noenc` suppresses this.

6.3 Using **TIPA** with PSNFSS

In order to use TIPA with `times.sty`, declare the use of `times.sty` before declaring `tipa` packages.

```
\documentclass{article}
\usepackage{times}
\usepackage{tipa}
```

Font description files `t3ptm.fd` and `t3phv.fd` are automatically loaded by the above declaration.

This manual can be typeset with Times Roman and XIPA fonts by uncommenting the two lines that appear near the top of the file `tipaman.tex`.

6.4 Other options

TIPA can be extended by the options `tone`, `extra`.

If you want to use the optional package for 'tone letters', add '`tone`' option to the `\usepackage` command that declares `tipa` package.

```
\usepackage[tone]{tipa}
```

And if you want to use diacritics for extIPA and VoQS, specify '`extra`' option.

```
\usepackage[extra]{tipa}
```

Finally there is one more option called '`safe`', which is used to suppress definitions of some possibly 'dangerous' commands of TIPA.

```
\usepackage[safe]{tipa}
```

More specifically, the following commands are suppressed by declaring the `safe` option. Explanation on the function of each command will be given later.

- `\s` (equivalent to `\textsyllabic`)
- `\*` (already defined in plain TeX)
- `\|, \:, \;, \!` (already defined in LaTeX)

7   Input Commands for Phonetic Symbols

7.1   Ordinary phonetic symbols

TIPA phonetic symbols can be input by the following two ways.

(1) Input macro names in the normal text environment.

(2) Input macro names or *shortcut characters* within the follwoing groups or environment.

- `\textipa{...}`[12]
- `{\tipaencoding ...}`
- `\begin{IPA} ... \end{IPA}`

(These groups and environment will be henceforth refered to as the *IPA environment*.)

A shortcut character refers to a single character that is assigned to a specific phonetic symbol and that can be directly input by an ordinary keyboard. In TIPA fonts, the character codes for numerals and uppercase letters in the normal ASCII encoding are assigned to such shortcut characters, because numerals and uppercase letters are usually not used as phonetic symbols. And additional shortcut characters for symbols such as æ, œ, ø may also be used if you are using a T1 encoded font and an appropriate input system for it.

The following pair of examples show the same phonetic transcription of a English word that are input by the above mentioned two input methods.

Input 1:	`[\textsecstress\textepsilon kspl\textschwa`
	`\textprimstress ne\textsci\textesh\textschwa n]`
Output 1:	[ˌɛksplə'neɪʃən]
Input 2:	`\textipa{[""Ekspl@"neIS@n]}`
Output 2:	[ˌɛksplə'neɪʃən]

It is apparent that inputting in the IPA environment is far easier than in the normal text environment. Moreover, although the outputs of the above examples look almost the same, they are *not* identical, exactly speaking. This is because in the IPA environment automatic kerning between symbols is enabled, as is illustrated by the following pair of examples.

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[12]I personally prefer a slightly shorter name like `\ipa` rather than `\textipa` but this command was named after the general convention of LaTeX 2ε. The same can be said to all the symbol names beginning with `\text`.

Symbol name	Macro name	Symbol
Turned A	\textturna	ɐ
Glottal Stop	\textglotstop	ʔ
Right-tail D	\textrtaild	ɖ
Small Capital G	\textscg	ɢ
Hooktop B	\texthtb	ɓ
Curly-tail C	\textctc	ɕ
Crossed H	\textcrh	ħ
Old L-Yogh Ligature	\textOlyoghlig	ɮ
Beta	\textbeta	β

Table 3: Naming of TIPA symbols

Input 1:	v\textturnv v w\textsca w y\textturny y [\textesh]
Output 1:	vʌv wᴀw yʎy [ʃ]
Input 2:	\textipa{v2v w\textsca w yLy [S]}
Output 2:	vʌv wᴀw yʎy [ʃ]

Table 2 shows most of the shortcut characters together with the corresponding characters in the ASCII encoding.

7.2 Naming of phonetic symbols

Every TIPA phonetic symbol has a unique symbol name, such as *Turned A, Hooktop B, Schwa*.[13] Also each symbol has a corresponding control sequence name, such as \textturna, \texthtb, \textschwa. The name used as a control sequence is usually an abbreviated form of the corresponding symbol name with a prefix \text. The conventions used in the abbreviation are as follows.

- Suffixes and endings such as '-ive', '-al', '-ed' are omitted.
- 'right', 'left' are abbreviated to r, l respectively.
- For 'small capital' symbols, prefix sc is added.
- A symbol with a hooktop is abbreviated as ht...
- A symbol with a curly-tail is abbreviated as ct...
- A 'crossed' symbol is abbreviated as cr...
- A ligature is abbreviated as ...lig.
- For an old version of a symbol, prefix O is added.

Note that the prefix O (old) should be given in uppercase letter.

Table 3 shows some examples of correspondence between symbol names and control sequence names.

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[13] The naming was made based on the literature listed in the section entitled "Selection of Symbols" (section 3.1). And users of TSIPA should be careful because TIPA's naming is slightly modified from that of TSIPA.

7.3 Ligatures

Just like the symbols such as ", ", –, —, fi, ff are realized as ligatures by inputting ``, '', --, ---, fi, ff in TEX, two of the TIPA symbols, namely *Secondary Stress* and *Double Pipe*, and double quotation marks[14] can be input as ligatures in the IPA environment.

> *Input*: \textipa{" "" | || `` ''}
>
> *Output*: ˌ , ǀ ‖ " "

7.4 Special macros *, \;, \: and \!

TIPA defines *, \;, \: and \! as special macros in order to easily input phonetic symbols that do not have a shortcut character explained above. Before explaining how to use these macros, it is necessary to note that these macros are primarily intended to be used by linguists who usually do not care about things in math mode. And they can be 'dangerous' in that they override existing LATEX commands used in the math mode. So if you want to preserve the original meaning of these commands, daclare the option 'safe' at the preamble.

The macro * is used in three different ways. First, when this macro is followed by one of the letters f, k, r, t or w, it results in a turned symbol.[15]

> *Input*: \textipa{*f *k *r *t *w}
>
> *Output*: ɟ ʞ ɹ ʇ ʍ

Secondly, when this macro is followed by one of the letters j, n, h, l or z, it results in a frequently used symbol that has otherwise no easy way to input.

> *Input*: \textipa{*j *n *h *l *z}
>
> *Output*: ɟ ɲ ħ ɬ ʑ

Thirdly, when this macro is followed by letters other than the above cases, they are turned into the symbols of the default text font. This is useful in the IPA environment to select symbols temporarily from the normal text font.

> *Input*: \textipa{*A dOg, *B k\ae{}t, ma\super{*{214}}}
>
> *Output*: A dɔg, B kæt, ma²¹⁴

The remaining macros \;, \: and \! are used to make small capital symbols, retroflex symbols, and implosives or clicks, respectively.

> *Input*: \textipa{\;B \;E \;A \;H \;L \;R}
>
> *Output*: ʙ ɞ ᴀ ʜ ʟ ʀ
>
> *Input*: \textipa{\:d \:l \:n \:r \:s \:z}
>
> *Output*: ɖ ɭ ɳ ɽ ʂ ʐ
>
> *Input*: \textipa{\!b \!d \!g \!j \!G \!o}
>
> *Output*: ɓ ɗ ɠ ʄ ɢ ʘ

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[14]Although TIPA fonts do not include the symbols " and ", a negative value of kerning is automatically inserted between ' and ', ' and ', so that the same results can be obtained as in the case of the normal text font.

[15]This idea was pointed out by Jörg Knappen.

Input in the normal text environment	Input in the IPA environment	Output
\'a	\'a	á
\"a	\"a	ä
\ a	\~a	ã
\r{a}	\r{a}	å
\textsyllabic{m}	\s{m}	m̩
\textsubumlaut{a}	\"*a	a̤
\textsubtilde{a}	\~*a	a̰
\textsubring{a}	\r*a	ḁ
\textdotacute{e}	\.'e	ĕ́
\textgravedot{e}	\`.e	ĕ̀
\textacutemacron{a}	\'=a	ā́
\textcircumdot{a}	\^.a	â̇
\texttildedot{a}	\~.a	ã̇
\textbrevemacron{a}	\u=a	ā̆

Table 4: Examples of inputting accents

7.5 Punctuation marks

The following punctuation marks and text symbols that are normally included in the text encoding are also included in the T3 encoding so that they can be directly input in the IPA environment.

Input: \textipa{! ' ( ) * + , - .\ / = ?
        [ ] '}

Output: ! ' ( ) * + , - . / = ? [ ] '

All the other punctuation marks and text symbols that are not included in T3 need to be input with a prefix * explained in the last section when they appear in the IPA environment.

Input: \textipa{*; *: *@ *\# *\$ *\& *\% *\{ *\}}

Output: ; : @ # $ & % { }

7.6 Accents and diacritics

Table 4 shows how to input accents and diacritics in TIPA with some examples. Here again, there are two kinds of input methods; one for the normal text environment, and the other for the IPA environment.

In the IPA environment, most of the accents and diacritics can be input more easily than in the normal text environment, especially in the cases of subscript symbols that are normally placed over a symbol and in the cases of combined accents, as shown in the table.

As can be seen by the above examples, most of the accents that are normally placed over a symbol can be placed under a symbol by adding an * to the corresponding accent command in the IPA environment.

Input in the normal text environment	Input in the IPA environment	Output
\textsubbridge{t}	|[t	t̪
\textinvsubbridge{t}	|]t	t̺
\textsublhalfring{a}	|(a	a̜
\textsubrhalfring{a}	|)a	a̹
\textroundcap{k}	|c{k}	k̑
\textsubplus{o}	|+o	o̟
\textraising{e}	|'e	e̝
\textlowering{e}	|`e	e̞
\textadvancing{o}	|<o	o̟
\textretracting{a}	|>a	a̠
\textovercross{e}	|x{e}	ĕ
\textsubw{k}	|w{k}	k̫
\textseagull{t}	|m{t}	t̼

Table 5: Examples of the accent prefix \|

The advantage of IPA environment is further exemplified by the all-purpose accent \|, which is used as a macro prefix to provide shortcut inputs for the diacritics that otherwise have to be input by lengthy macro names. Table 5 shows examples of such accents. Note that the macro \| is also 'dangerous' in that it has been already defined as a math symbol of LaTeX. So if you want to preserve the original meaning of this macro, declare 'safe' option at the preamble.

Finally, examples of words with complex accents that are input in the IPA environment are shown below.

Input: \textipa{*\|c{k}\r*mt\'om *bhr\'=at\=er}

Output: *k̑m̩tóm *bhrátēr

For a full list of accents and diacritics, see Appendix A

7.7   Superscript symbols

In the normal text environment, superscript symbols can be input by a LaTeX macro called \textsuperscript. This macro takes one argument which can be either a symbol or a string of symbols, and can be nested.

Since the name of this macro is too long, TIPA provides an abbreviated form of this macro called \super.

Input 1: `t\textsuperscript h  k\textsuperscript w`
`a\textsuperscript{bc}`
`a\textsuperscript{b\textsuperscript{c}}`

Output 1: tʰ kʷ aᵇᶜ aᵇᶜ

Input 2: `\textipa{t\super{h}  k\super{w}`
`a\super{bc}  a\super{b\super{c}}}`

Output 2: tʰ kʷ aᵇᶜ aᵇᶜ

(A question: A careful reader may have noticed that the above *Output1* and *Output2* slightly differ. Explain the reason.)

These macros automatically select the correct size of superscript font no matter what size of the text font is used.

7.8 Tone letters

TIPA provides a flexible system of macros for 'tone letters'. A tone letter is represented by a macro called '\tone', which takes one argument consisting of a string of numbers ranging from 1 to 5. These numbers denote pitch levels, 1 being the lowest and 5 the highest. Within this range, any combination is allowed and there is no limit in the length of combination.

As an example of the usage of tone letter macro, the four tones of Chinese are shown below.

> *Input*: \tone{55}ma ''mother'', \tone{35}ma ''hemp'',
> \tone{214}ma ''horse'', \tone{51}ma ''scold''
>
> *Output*: ma˥ "mother", ma˧˥ "hemp", ma˨˩˦ "horse", ma˥˩ "scold"

The next example looks ridiculous but shows capabilities of the tone letter macro.

> *Input*: \tone{15253545}
>
> *Output*: ꜒꜖꜒꜖꜒

7.8.1 \stone

In some languages, length distinctions accompany the tone letter description. In such cases a command called \stone can be used to represent a tone letter that is shorter than a usual one. The next example from Cantonese illustrates this (look at the examples for *entering tones*).

Tone name	Input	Output
high level	\tone{53} or \tone{55}	˥˩ or ˥
low level	\tone{21} or \tone{22}	˨˩ or ˨
high rising	\tone{35}	˧˥
low rising	\tone{24}	˨˦
high departing	\tone{44}	˦
low departing	\tone{33}	˧
high entering	\stone{55}	˥
mid entering	\stone{44}	˦
low entering	\stone{33}	˧

7.8.2 \rtone

In some languages, the level/contour bars are placed at the right hand side of the vertical bar. In such cases a command called \rtone is used instead of \tone. The next example is from the Kyoto Japanese.

> *Input*: \textipa{[\rtone{11}a\rtone{53}me]} 'rain'
>
> *Output*: [La˥˩me] 'rain'

Roman	`\textipa{f@"nEtIks}`	fə'nɛtɪks
Slanted	`\textipa{\slshape f@"nEtIks}`	*fə'nɛtɪks*
or	`\textipa{\textsl{f@"nEtIks}}`	*fə'nɛtɪks*
or	`\textsl{\textipa{f@"nEtIks}}`	*fə'nɛtɪks*
Bold extended	`\textipa{\bfseries f@"nEtIks}`	**fə'nɛtɪks**
or	`\textipa{\textbf{f@"nEtIks}}`	**fə'nɛtɪks**
or	`\textbf{\textipa{f@"nEtIks}}`	**fə'nɛtɪks**
Sans serif	`\textipa{\sffamily f@"nEtIks}`	fə'nɛtɪks
or	`\textipa{\textsf{f@"nEtIks}}`	fə'nɛtɪks
or	`\textsf{\textipa{f@"nEtIks}}`	fə'nɛtɪks
Typewriter Text	`\textipa{\ttfamily f@"nEtIks}`	fə'nɛtɪks
or	`\textipa{\texttt{f@"nEtIks}}`	fə'nɛtɪks
or	`\texttt{\textipa{f@"nEtIks}}`	fə'nɛtɪks

Table 6: Examples of font switching

8   How easy to input phonetic symbols?

Let us briefly estimate here how much easy (or difficult) to input phonetic symbols with TIPA in terms of the number of keystrokes.

The following table shows statistics for all the phonetic symbols that appear in the '93 version of IPA chart (diacritics and symbols for suprasegmentals excluded). It is assumed here that each symbol is input within the IPA environment and the `safe` option is not specified.

keystrokes	*number*	*examples*
1	65	a, b, ə, ɑ, β, etc.
2	2	ø, ‖
3	30	æ, ʈ, ʙ, ɓ, etc.
5	1	ç
more than 5	7	ɛ, ʔ, ǂ, ɥ, etc.

As is shown in the table, about 92% of the symbols can be input within three keystrokes.

9   Changing font styles

This version of TIPA includes five styles of fonts, i.e., roman, slanted, bold, bold extended, sans serif and typewriter. These styles can be switched in much the same way as in the normal text fonts (see table 6).

The bold fonts are usually not used within the standard LaTeX class packages so that if you want to use them, it is necessary to use low-level font selection commands of LaTeX 2_ε.

Input: `{\fontseries{b}\selectfont abcdefg \textipa{ABCDEFG}}`

Output: **abcdefg ɑβɕðɛɸɣ**

Note also that slanting of TIPA symbols should correctly work even in the cases of combined accents and in the cases of symbols made up by macros.

Input:	`\textsl{\textipa{\'{\"{\u*{e}}}}}`
Output:	ế
Input:	`\textsl{\textdoublebaresh}`
Output:	ʄ (This symbol is composed by a macro.)

10   Internal commands

Some of the internal commands of TIPA are defined without the letter @ in order to allow a user to extend the capability of TIPA.

10.1   \ipabar

Some TIPA symbols such as `\textbarb` ƀ, `\textcrtwo` � are defined by using an internal macro command `\ipabar`. This command is useful when you want to make barred or crossed symbols not defined in TIPA.

This command requires the following five parameters to control the position of the bar.

- `#1` the symbol to be barred
- `#2` the height of the bar (in dimen)
- `#3` bar width
- `#4` left kern added to the bar
- `#5` right kern added to the bar

Parameters `#3`, `#4`, `#5` are to be given in a scaling factor to the width of the symbol, which is equal to 1 if the bar has the same width with the symbol in question. For example, the following command states a barred b (ƀ) of which the bar position in the y-coordinate is `.5ex` and the width of the bar is slightly larger than that of the letter b.

```
% Barred B
\newcommand\textbarb{%
  \ipabar{{\tipaencoding b}}{.5ex}{1.1}{}{}}
```

Note that the parameters `#4` and `#5` can be left blank if the value is equal to 0.

And the next example declares a barred c (ꞓ) of which the bar width is a little more than half as large as the letter c and it has the same size of kerning at the right.

```
% Barred C
\newcommand\textbarc{%
  \ipabar{{\tipaencoding c}}{.5ex}{.55}{}{.55}}
```

More complex examples with the `\ipabar` command are found in `T3enc.def`.

10.2 \tipaloweraccent, \tipaupperaccent

These two commands are used in the definitions of TIPA accents and diacritics. They are special forms of the commands \loweraccent and \upperaccent that are defined in exaccent.sty. The difference between the commands with the prefix tipa and the ones without it is that the former commands select accents from a T3 encoded font while the latter ones do so from the current text font.

These commands take two parameters, the code of the accent (in decimal, octal or hexadecimal number) and the symbol to be accented, as shown below.

    Input: \tipaupperaccent{0}{a}

  Output: à

Optionally, these commands can take a extra parameter to adjust the vertical position of the accent. Such an adjustment is sometimes necessary in the definition of a nested accent. The next example shows TIPA's definition of the 'Circumflex Dot Accent' (e.g., å).

```
% Circumflex Dot Accent
\newcommand\textcircumdot[1]{\tipaupperaccent[-.2ex]{2}%
  {\tipaupperaccent[-.1ex]{10}{#1}}}
```

This definition states that a dot accent is placed over a symbol thereby reducing the vertical distance between the symbol and the dot by .1ex and a circumflex accent is placed over the dot and the distance between the two accents is reduced by .2ex.

If you want to make a combined accent not included in TIPA, you can do so fairly easily by using these two commands together with the optional parameter. For more examples of these commands, see tipa.sty and extraipa.sty.

10.3 \tipaLoweraccent, \tipaUpperaccent

These two commands differ from the two commands explaind above in that the first parameter should be a symbol (or any other things, typically an \hbox), rather than the code of the accent. They are special cases of the commands \Loweraccent and \Upperaccent and the difference between the two pairs of commands is the same as before.

The next example makes a schwa an accent.

    Input: \tipaUpperaccent[.2ex]%
            {\lower.8ex\hbox{\textipa{\super@}}}{a}

  Output: å

The next example is an interesting application of this command for the Middle High German (This macro and the example below are provided by Christian Folini and now included in tipa.sty).

```
\newcommand{\sups}[2]{\textipa{\tipaUpperaccent[.2ex]{%
  \lower.8ex\hbox{\super{#2}}}{#1}}}
```

Und swer dc mit flis tůͦt, so stat das gelt und ǒch dù gůͦter in deste bessere behabnùsse und behùgde. (1330 AD. Translation: And if this is done with diligence, the money and the affairs will be in better shape.)

In this example, tůͦt is input as `t\sups{u}{o}t` and so on.

10.4 \ipaclap

This command is useful if you need to compose a new symbol by overlapping two symbols. Alignment is made at the center of each symbol.

The next example shows how to make a Slashed B.

Input: `\ipaclap{\textipa{b}}{\textipa{/}}`

Output: ⱒ

11   Manual Kerning

The shapes of phonetic symbols are sometimes *nasty* in the sense that they can have a leftward or rightward protrusion that cannot be found in the case of a normal text fonts. In such cases it is sometimes necessary to input kerning commands manually.

One way to do this is to prepare a set of kerning commands like the following:

```
\newcommand\K{\kern.05em} % small amount of kerning
\newcommand\KK{\kern.1em} % middle amount of kerning
\newcommand\KKK{\kern.2em} % big amount of kerning
```

And then to put these commands whenever necessary. For example:

Input: `\textipa{[\textrhooke r]}`

Output: [ɚr] — This is OK but

Input: `\textipa{[\textrhooke]}`

Output: [ɚ] — this doesn't look good so that

Input: `\textipa{[\textrhooke\KK]}`

Output: [ɚ] — manually fixed like this.

12   Acknowledgments

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Appendix

A   Annotated List of **TIPA** Symbols

For each symbol, a large scale image of the symbol is displayed with a frame. Within the frame, horizontal lines that indicate `x_height` and baseline are also shown. At the top left corner of a frame, a number indicating the octal code of the symbol is shown. In the case of a symbol from `tipx` fonts, the code number is underlined.

Next, the following informations are shown at the right of each symbol in this order: (1) the name of the symbol, (2) explanation on its usage with some examples (for non-IPA usages, an asterik is put at the begining), (3) input method in typewriter style, and finally (4) sources or references.

Sometimes the input method is displayed in the form of *Input1: xxx, Input2: yyy*. In such cases *Input1* indicates the one used in the normal text environment and *Input2* the one used in the IPA environment.

The following abbreviations are used in the examples of usage and explanations in the footnote.

> *ExtIPA = ExtIPA Symbols for Disordered Speech*
> *VoQS = Voice Quality Symbols*
> *PSG = Phonetic Symbol Guide* [10]
> *Handbook = Handbook of the International Phonetic Association* [9]
> *Principles = Principles of the International Phonetic Association* [5]
> *JIPA = Journal of the International Phonetic Association*
> *IE* Indo-European
> *OHG* Old High German
> *OCS* Old Church Slavic

A.1   Vowels and Consonants

'141   Lower-case A   *Usage*: open front unrounded vowel
   Input: `a`
   Sources: IPA '49–'96

'065   Turned A   *Usage*: open-mid–open central unrounded vowel
   Input1: `\textturna`   *Input2*: `5`
   Sources: IPA '49–'96

'040   Right-hook A
   Input: `\textrhooka`
   Sources:

'043   Left-hook four
   Input: `\textlhookfour`
   Sources:

'101   Script A   *Usage*: open back unrounded vowel
   Input1: `\textscripta`   *Input2*: `A`
   Sources: IPA '49–'96

'066	ɒ	**Turned Script A** *Usage*: open back rounded vowel *Input1*: `\textturnscripta` *Input2*: `6` *Sources*: IPA '49–'96
'041	ɑ	**Inverted script A** *Input*: `\textinvscripta` *Sources*:
'346	æ	**Ash** *Usage*: open-mid–open front unrounded vowel *Input*: `\ae` *Sources*: IPA '49–'96
'042	ɶ	**A-O Ligature** *Input*: `\textaolig` *Sources*:
'300	ᴀ	**Small Capital A**[16] *Usage*: *open central unrounded vowel *Input1*: `\textsca` *Input2*: `\;A` *Sources*:
'160	∀	**Inverted small capital A** *Input*: `\textinvsca` *Sources*:
'161	ᴁ	**Small capital A-O Ligature** *Input*: `\textscaolig` *Sources*:
'062	ʌ	**Turned V**[17] *Usage*: open-mid back unrounded vowel *Input1*: `\textturnv` *Input2*: `2` *Sources*: IPA '49–'96
'142	b	**Lower-case B** *Usage*: voiced bilabial plosive *Input*: `b` *Sources*: IPA '49–'96
'272	ь	**Soft Sign** *Usage*: *as in *OCS* ognь 'fire'. *Input*: `\textsoftsign` *Sources*:
'273	ъ	**Hard Sign** *Usage*: *as in *OCS* gradъ 'town'. *Input*: `\texthardsign` *Sources*:
'341	ɓ	**Hooktop B** *Usage*: voiced bilabial implosive *Input1*: `\texthtb` *Input2*: `\!b` *Sources*: IPA '49–'96
'340	ʙ	**Small Capital B** *Usage*: voiced bilabial trill *Input1*: `\textscb` *Input2*: `\;B` *Sources*: IPA '89–'96
'240	ƀ	**Crossed B** *Input*: `\textcrb` *Sources*:

[16]This symbol is fairly common among Chinese phoneticians.

[17]In a previous version of *PSG* this symbol was called 'Inverted V' but it was apparently a mistake.

|		
Macro	Ƀ	**Barred B** *Input*: \textbarb *Sources*:
'102	β	**Beta** *Usage*: voiced bilabial fricative *Input1*: \textbeta *Input2*: B *Sources*: IPA '49–'96
'143	c	**Lower-case C** *Usage*: voiceless palatal plosive *Input*: c *Sources*: IPA '49–'96
Macro	₵	**Barred C** *Input*: \textbarc *Sources*:
'301	ƈ	**Hooktop C** *Usage*: voiceless palatal implosive *Input*: \texthtc *Sources*: IPA '89
Macro	č	**C Wedge** *Usage*: *equivalent to IPA ʧ *Input*: \v{c} *Sources*:
'347	ç	**C Cedilla** *Usage*: voiceless palatal fricative *Input*: \c{c} *Sources*: IPA '49–'96
'103	ɕ	**Curly-tail C** *Usage*: voiceless alveolo-palatal fricative *Input1*: \textctc *Input2*: C *Sources*: IPA '49–'96
'302	Ꞓ	**Stretched C**[18] *Usage*: postalveolar click *Input*: \textstretchc *Sources*: IPA '49, '79
'044	Ƈ	**Stretched C (original form)** *Input*: \textstretchcvar *Sources*:
'045	ʗ	**Curly-tail stretched C** *Input*: \textctstretchc *Sources*:
'046	ɕ	**Curly-tail stretched C (original form)** *Input*: \textctstretchcvar *Sources*:
'144	d	**Lower-case D** *Usage*: voiced dental/alveolar plosive *Input*: d *Sources*: IPA '49–'96
'241	đ	**Crossed D** *Input*: \textcrd *Sources*:

---

[18]The shape of this symbol differs according to the sources. In *PSG* and recent articles in *JIPA*, it is 'stretched' toward both the ascender and descender regions and the whole shape looks like a thick staple. In the old days, however, it was streched only toward the descender and the whole shape looked more like a stretched c.

Macro	đ	**Barred D** *Input*: `\textbard` *Sources*:
'342	ɗ	**Hooktop D** *Usage*: voiced dental/alveolar implosive *Input1*: `\texthtd` *Input2*: `\!d` *Sources*: IPA '49–'96
'343	ɖ	**Right-tail D** *Usage*: voiced retroflex plosive *Input1*: `\textrtaild` *Input2*: `\:d` *Sources*: IPA '49–'96
'243	ɗ	**Hooktop right-tail D** *Usage*: voiced retroflex implosive *Input*: `\texthtrtaild` *Sources*: PSG, Handbook
'242	ȡ	**Curly-tail D** *Usage*: *voiced alveolo-palatal plosive *Input*: `\textctd` *Sources*:
'047	ɼ	**Front-hook D** *Input*: `\textfrhookd` *Sources*:
'050	ɗ	**Front-hook D (Original)** *Input*: `\textfrhookdvar` *Sources*:
'051	ȸ	**D-B ligature** *Input*: `\textdblig` *Sources*:
Macro	ʣ	**D-Z Ligature** *Input*: `\textdzlig` *Sources*:
Macro	ʥ	**D-Curly-tail Z Ligature** *Input*: `\textdctzlig` *Sources*:
'303	ʤ	**D-Yogh Ligature** *Usage*: voiced alveolar lateral fricative *Input*: `\textdyoghlig` *Sources*: IPA '49–'96
Macro	ʥ	**Curly-tail D-Curly-tail Z Ligature** *Input*: `\textctdctzlig` *Sources*:
'162	ᴅ	**Small capital Greek delta** *Input*: `\textscdelta` *Sources*:
'104	ð	**Eth** *Usage*: voiced dental fricative *Input1*: `\dh` *Input2*: `D` *Sources*: IPA '49–'96
'145	e	**Lower-case E** *Usage*: colse-mid front unrounded vowel *Input*: `e` *Sources*: IPA '49–'96

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'052 **Right-hook E**
Input: `\textrhooke`
Sources:

'100 **Schwa**   *Usage*: mid central unrounded vowel
Input1: `\textschwa`   *Input2*: `@`
Sources: IPA '49–'96

'304 **Right-hook Schwa**   *Usage*: r-colored ə
Input: `\textrhookschwa`
Sources: IPA '49, '79

'071 **Reversed E**   *Usage*: close-mid central unrounded vowel
Input1: `\textreve`   *Input2*: `9`
Sources: IPA '49–'96

'244 **Small Capital E**
Input1: `\textsce`   *Input2*: `\;E`
Sources:

'105 **Epsilon**   *Usage*: open-mid front unrounded vowel
Input1: `\textepsilon`   *Input2*: `E`
Sources: IPA '49–'96

'053 **Right-hook epsilon**
Input: `\textrhookepsilon`
Sources:

'305 **Closed Epsilon**   *Usage*: open-mid central rounded vowel
Input: `\textcloseepsilon`
Sources: IPA '93

'063 **Reversed Epsilon**   *Usage*: open-mid central unrounded vowel
Input1: `\textrevepsilon`   *Input2*: `3`
Sources: IPA '49–'96

'307 **Right-hook Reversed Epsilon**   *Usage*: r colored ɜ
Input: `\textrhookrevepsilon`
Sources:

'306 **Closed Reversed Epsilon**
Input: `\textcloserevepsilon`
Sources:

'146 **Lower-case F**   *Usage*: voiceless labiodental fricative
Input: `f`
Sources: IPA '49–'96

'163 **Small capital F**
Input: `\textscf`
Sources:

'147 **Lower-case G**   *Usage*: voiced velar plosive
Input1: `\textscriptg`   *Input2*: `g`
Sources: IPA '49–'96

Macro **Barred G**
Input: `\textbarg`
Sources:

Crossed G
Input: \textcrg
Sources:

'344 **Hooktop G**   *Usage*: voiced velar implosive
Input1: \texthtg   *Input2*: \!g
Sources: IPA '49–'96

'245 **Text G**
Input1: g   *Input2*: \textg
Sources:

'345 **Small Capital G**   *Usage*: voiced uvular plosive
Input1: \textscg   *Input2*: \;G
Sources: IPA '49–'96

'311 **Hooktop Small Capital G**   *Usage*: voiced uvular implosive
Input1: \texthtscg   *Input2*: \!G
Sources: IPA '89–'96

'107 **Gamma**   *Usage*: voiced velar fricative
Input1: \textgamma   *Input2*: G
Sources: IPA '49–'96

'054 **Greek gamma**
Input: \textgrgamma
Sources:

'055 **Front-tail gamma**
Input: \textfrtailgamma
Sources:

'056 **Back-tail gamma**
Input: \textbktailgamma
Sources:

'310 **Baby Gamma**   *Usage*: close-mid back unrounded vowel
Input: \textbabygamma
Sources: IPA '49, '79

'067 **Ram's Horns**   *Usage*: close-mid back unrounded vowel
Input1: \textramshorns   *Input2*: 7
Sources: IPA '89–'96

'150 **Lower-case H**   *Usage*: voiceless glottal fricative
Input: h
Sources: IPA '49–'96

'377 **H-V Ligature**   *Usage*: *as in *Gothic* ƕas 'what'.
Input: \texthvlig
Sources:

'350 **Crossed H**   *Usage*: voiceless pharyngeal fricative
Input: \textcrh
Sources: IPA '49–'96

'110 **Hooktop H**   *Usage*: voiced glottal fricative
Input1: \texthth   *Input2*: H
Sources: IPA '49–'96

'057	ꜧ	**Right-tail hooktop H** *Input*: \textrtailhth *Sources*:
'060	ꜧ	**Heng** *Input*: \textheng *Sources*:
'312	ɧ	**Hooktop Heng** *Usage*: simultaneous ʃ and x *Input*: \texththeng *Sources*: IPA '49–'96
'064	ɥ	**Turned H** *Usage*: voiced labial-palatal approximant *Input1*: \textturnh *Input2*: 4 *Sources*: IPA '49–'96
'313	ʜ	**Small Capital H** *Usage*: voiceless epiglottal fricative *Input1*: \textsch *Input2*: \;H *Sources*: IPA '89–'96
'151	i	**Lower-case I** *Usage*: close front unrounded vowel *Input*: i *Sources*: IPA '49–'96
'031	ı	**Undotted I** *Input*: \i *Sources*:
'061	ɨ	**Barred I** *Usage*: close central unrounded vowel *Input1*: \textbari *Input2*: 1 *Sources*: IPA '49–'96
'314	ɿ	**Iota** *Input*: \textiota *Sources*: IPA '49, '79
'061	ɿ	**Left-hooktop I**[19] *Input*: \textlhti *Sources*:
'246	ʅ	**Left-hooktop Long I**[20] *Input*: \textlhtlongi *Sources*:
'247	ʮ	**Viby I**[21] *Input*: \textvibyi *Sources*:

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[19]This symbol is sometimes found instead of ʅ (next item) in textbooks of Chinese.

[20]The two symbols ɿ and ʅ are mainly used among Chinese linguists. These symbols are based on "det svenska landsmålsalfabetet" and introduced to China by Bernhard Karlgren. The original shapes of these symbols were in italic as was always the case with "det svenska landsmålsalfabetet". It seems that the Chinese linguists who wanted to continue to use these symbols in IPA changed their shapes upright. *PSG*'s descriptions to the origin of these symbols are inacurate.

[21]I call this symbol 'Viby I', based on the following description by Bernhard Karlgren: "Une voyelle très analogue à ʅ se rencontre dans certains dial. suédois; on l'appelle 'i de Viby'." (*Études sur la phonologie chinoise*, 1915–26, p. 295)

Macro		Raised Viby I

Macro Raised Viby I
Input: `\textraisevibyi`
Sources:

'111 Small Capital I   *Usage*: close–close-mid front unrounded vowel
Input1: `\textsci`   *Input2*: `I`
Sources: IPA '89–'96

'152 Lower-case J   *Usage*: voiced palatal approximant
Input: `j`
Sources: IPA '49–'96

'032 Undotted J
Input: `\j`
Sources:

'112 Curly-tail J[22]   *Usage*: voiced palatal fricative
Input1: `\textctj`   *Input2*: `J`
Sources: IPA '89–'96

'062 Curly-tail J (a variety found in 1996 IPA)
Input: `\textctjvar`
Sources:

'250 Small Capital J
Input1: `\textscj`   *Input2*: `\;J`
Sources:

Macro J Wedge   *Usage*: *equivalent to IPA ʥ
Input: `\v{\j}`
Sources:

'351 Barred Dotless J   *Usage*: voiced palatal plosive
Input: `\textbardotlessj`
Sources: IPA '89–'96

'315 Old Barred Dotless J   *Usage*: voiced palatal plosive
Input: `\textObardotlessj`
Sources: IPA '49, '79

'352 Hooktop Barred Dotless J[23]   *Usage*: voiced palatal implosive
Input1: `\texthtbardotlessj`   *Input2*: `\!j`
Sources: IPA '89–'96

'063 Hooktop barred dotless J (a variety)
Input: `\texthtbardotlessjvar`
Sources:

'153 Lower-case K   *Usage*: voiceless velar plosive
Input: `k`
Sources: IPA '49–'96

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[22]In the official IPA charts of '89 through '96, this symbol has a dish serif on top of the stem, rather than the normal sloped serif found in the letter j. I found no reason why it should have a dish serif here, so I changed it to a normal sloped serif. The official (?) IPA shape can be used by the `\textctjvar` command. (ǰ)

[23]In *PSG* the shape of this symbol slightly differs. Here I followed the shape found in IPA '89–'96.

'316 **Hooktop K** *Usage*: voiceless velar inplosive
Input: `\texthtk`
Sources: IPA '89

'251 **Turned K**
Input1: `\textturnk` *Input2*: `\*k`
Sources:

'164 **Small capital K**
Input: `\textsck`
Sources:

'165 **Turned small capital K**
Input: `\textturnsck`
Sources:

'154 **Lower-case L** *Usage*: alveolar lateral approximant
Input: `l`
Sources: IPA '49–'96

'353 **L with Tilde**
Input1: `\textltilde` *Input2*: `\|~l`
Sources: IPA '49–'96

'252 **Barred L**
Input: `\textbarl`
Sources:

'354 **Belted L** *Usage*: voiceless alveolar lateral fricative
Input: `\textbeltl`
Sources: IPA '49–'96

'355 **Right-tail L** *Usage*: retroflex lateral approximant
Input1: `\textrtaill` *Input2*: `\:l`
Sources: IPA '49–'96

'320 **L-Yogh Ligature** *Usage*: voiced alveolar lateral fricative
Input: `\textlyoghlig`
Sources: IPA '89–'96

'255 **Old L-Yogh Ligature** *Usage*: voiced alveolar lateral fricative
Input: `\textOlyoghlig`
Sources: IPA '49, '79

'317 **Small Capital L** *Usage*: velar lateral approximant
Input1: `\textscl` *Input2*: `\;L`
Sources: IPA '89–'96

'166 **Reversed small capital L**
Input: `\textrevscl`
Sources:

'253 **Lambda**
Input: `\textlambda`
Sources:

'254 **Crossed Lambda**
Input: `\textcrlambda`
Sources:

'155 Lower-case M *Usage*: bilabial nasal
Input: `m`
Sources: IPA '49–'96

'115 Left-tail M (at right) *Usage*: labiodental nasal
Input1: `\textltailm` *Input2*: `M`
Sources: IPA '49–'96

'127 Turned M *Usage*: close back unrounded vowel
Input1: `\textturnm` *Input2*: `W`
Sources: IPA '49–'96

'356 Turned M, Right Leg *Usage*: velar approximant
Input: `\textturnmrleg`
Sources: IPA '79, '89, '93

'064 H-M ligature
Input: `\texthmlig`
Sources:

'167 Small capital M
Input: `\textscm`
Sources:

'156 Lower-case N *Usage*: dental/alveolar nasal
Input: `n`
Sources: IPA '49–'96

'066 N, Right Leg
Input: `\textnrleg`
Sources: IPA '49

Macro N with Tilde
Input: `\~n`
Sources:

'361 Left-tail N (at left) *Usage*: palatal nasal
Input: `\textltailn`
Sources: IPA '49–'96

'065 Front-bar N
Input: `\textfrbarn`
Sources:

'116 Eng *Usage*: velar nasal
Input1: `\ng` *Input2*: `N`
Sources: IPA '49–'96

'357 Right-tail N *Usage*: retroflex nasal
Input1: `\textrtailn` *Input2*: `\:n`
Sources: IPA '49–'96

'256 Curly-tail N *Usage*: *alveolo-palatal nasal
Input: `\textctn`
Sources:

'066 Right leg N
Input: `\textnrleg`
Sources:

'360	N	Small Capital N *Usage*: uvular nasal *Input1*: `\textscn` *Input2*: `\;N` *Sources*: IPA '49–'96
'157	O	Lower-case O *Usage*: close-mid back rounded vowel *Input*: `o` *Sources*: IPA '49–'96
'362	ʘ	Bull's Eye *Usage*: bilabial click *Input1*: `\textbullseye` *Input2*: `\!o` *Sources*: IPA '79, '89, '93
'071	ʘ	Bull's eye (an old version) *Input*: `\textObullseye` *Sources*:
'070	θ	Barred O *Usage*: close-mid central rounded vowel *Input1*: `\textbaro` *Input2*: `8` *Sources*: IPA '49–'96
'370	ø	Slashed O *Usage*: close-mid front rounded vowel *Input*: `\o` *Sources*: IPA '49–'96
'067	♀	Female sign *Input*: `\textfemale` *Sources*:
'070	♀	Uncrossed female sign *Input*: `\textuncrfemale` *Sources*:
'367	œ	O-E Ligature *Usage*: open-mid front rounded vowel *Input*: `\oe` *Sources*: IPA '49–'96
'327	Œ	Small Capital O-E Ligature *Usage*: open front rounded vowel *Input1*: `\textscoelig` *Input2*: `\OE` *Sources*: IPA '79, '89, '93
'117	ɔ	Open O *Usage*: open-mid back rounded vowel *Input1*: `\textopeno` *Input2*: `O` *Sources*: IPA '49–'96
'072	ɔ̢	Right-hook open O *Input*: `\textrhookopeno` *Sources*:
'257	ɶ	Turned C(Open O)-E Ligature *Input*: `\textturncelig` *Sources*:
'260	ω	Omega *Input*: `\textomega` *Sources*:
'073	ɯ	Inverted omega *Input*: `\textinvomega` *Sources*:

'261 Small Capital Omega
Ω *Input*: `\textscomega`
   Sources:

'321 Closed Omega
ω *Input*: `\textcloseomega`
   Sources: IPA '49, '79

'160 Lower-case P   *Usage*: voiceless bilabial plosive
p *Input*: `p`
   Sources: IPA '49–'96

'074 Left-hook P
p *Input*: `\textlhookp`
   Sources:

'170 Small capital P
P *Input*: `\textscp`
   Sources:

'337 Wynn
p *Input*: `\textwynn`
   Sources:

'376 Thorn
þ *Input1*: `\textthorn`   *Input2*: `\th`
   Sources:

'120 A variety of thorn (1)
þ *Input*: `\textthornvari`
   Sources: PSG

'121 A variety of thorn (2)
þ *Input*: `\textthornvarii`
   Sources: PSG

'122 A variety of thorn (3)
þ *Input*: `\textthornvariii`
   Sources: PSG

'123 A variety of thorn (4)
þ *Input*: `\textthornvariv`
   Sources: PSG

'322 Hooktop P   *Usage*: voiceless bilabial implosive
ƥ *Input*: `\texthtp`
   Sources: IPA '89

'106 Phi   *Usage*: voiceless bilabial fricative
ɸ *Input1*: `\textphi`   *Input2*: `F`
   Sources: IPA '49–'96

'161 Lower-case Q   *Usage*: voiceless uvular plosive
q *Input*: `q`
   Sources: IPA '49–'96

'323 Hooktop Q   *Usage*: voiceless uvular implosive
ʠ *Input*: `\texthtq`
   Sources: IPA '89

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'075 Q-P ligature
Input: `\textqplig`
Sources:

'171 Small Capital Q[24]   *Usage*: *voiceless pharyngeal plosive
Input1: `\textscq`   *Input2*: `\;Q`
Sources:

'162 Lower-case R   *Usage*: alveolar trill
Input: `r`
Sources: IPA '49–'96

'122 Fish-hook R   *Usage*: alveolar tap or flap
Input1: `\textfishhookr`   *Input2*: `R`
Sources: IPA '49–'96

'324 Long-leg R   *Usage*: alveolar fricative trill
Input: `\textlonglegr`
Sources: IPA '49, '79

'363 Right-tail R   *Usage*: retroflex tap or flap
Input1: `\textrtailr`   *Input2*: `\:r`
Sources: IPA '49–'96

'364 Turned R   *Usage*: alveolar approximant
Input1: `\textturnr`   *Input2*: `\*r`
Sources: IPA '49–'96

'365 Turned R, Right Tail   *Usage*: retroflex approximant
Input1: `\textturnrrtail`   *Input2*: `\:R`
Sources: IPA '49–'96

'325 Turned Long-leg R   *Usage*: alveolar lateral flap
Input: `\textturnlonglegr`
Sources: IPA '49–'96

'366 Small Capital R   *Usage*: uvular trill
Input1: `\textscr`   *Input2*: `\;R`
Sources: IPA '49–'96

'113 Inverted Small Capital R   *Usage*: voiced uvular fricative
Input1: `\textinvscr`   *Input2*: `K`
Sources: IPA '49–'96

'172 Reversed small capital R
Input: `\textrevscr`
Sources:

'163 Lower-case S   *Usage*: voiceless alveolar fricative
Input: `s`
Sources: IPA '49–'96

Macro S Wedge   *Usage*: *equivalent to IPA ʃ
Input: `\v{s}`
Sources:

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[24]Suggested by Prof S. Tsuchida for Austronesian languages in Taiwan. In *PSG* 'Female Sign' and 'Uncrossed Female Sign'(pp. 110–111) are noted for pharyngeal stops, as proposed by Trager (1964). Also I'm not sure about the difference between an epiglottal plosive and a pharyngeal stop.

'371	Ş	**Right-tail S (at left)** *Usage*: voiceless retroflex fricative *Input1*: `\textrtails` *Input2*: `\:s` *Sources*: IPA '49–'96
'123	∫	**Esh** *Usage*: voiceless postalveolar fricative *Input1*: `\textesh` *Input2*: `S` *Sources*: IPA '49–'96
Macro	⨎	**Doube-barred Esh** *Input*: `\textdoublebaresh` *Sources*:
'262	∫	**Curly-tail Esh** *Usage*: palatalized ∫ *Input*: `\textctesh` *Sources*: IPA '49, '79
'076	ɺ	**Reversed esh with top loop** *Input*: `\textlooptoprevesh` *Sources*:
'164	t	**Lower-case T** *Usage*: voiceless dental/alveolar plosive *Input*: `t` *Sources*: IPA '49–'96
'326	ƭ	**Hooktop T** *Usage*: voiceless dental/alveolar implosive *Input*: `\texthtt` *Sources*: IPA '89
'263	ţ	**Left-hook T** *Usage*: palatalized t *Input*: `\textlhookt` *Sources*:
'372	ţ	**Right-tail T** *Usage*: voiceless retroflex plosive *Input1*: `\textrtailt` *Input2*: `\:t` *Sources*: IPA '49–'96
'077	·t	**Front-hook T** *Input*: `\textfrhookt` *Sources*:
'100	ʇ	**Curly-tail turned T** *Input*: `\textctturnt` *Sources*:
Macro	tɕ	**T-Curly-tail C Ligature** *Input*: `\texttctclig` *Sources*:
'265	ts	**T-S Ligature** *Input*: `\textttslig` *Sources*:
'331	tʃ	**T-Esh Ligature** *Input*: `\texttteshlig` *Sources*: IPA '49–'96
'330	ʇ	**Turned T** *Usage*: dental click *Input1*: `\textturnt` *Input2*: `\*t` *Sources*: IPA '49, '79

'264 Curly-tail T   *Usage*: *voiceless alveolo-palatal plosive
Input: \textctt
Sources:

Macro Curly-tail T-Curly-tail C Ligature
Input: \textcttctclig
Sources:

'124 Theta   *Usage*: voiceless dental fricative
Input1: \texttheta   *Input2*: T
Sources: IPA '49–'96

'165 Lower-case U   *Usage*: close back rounded vowel
Input: u
Sources: IPA '49–'96

'060 Barred U   *Usage*: close central rounded vowel
Input1: \textbaru   *Input2*: 0
Sources: IPA '49–'96

'125 Upsilon   *Usage*: close–close-mid back rounded vowel
Input1: \textupsilon   *Input2*: U
Sources: IPA '89–'96

'366 Small Capital U   *Usage*: *equivalent to IPA ʊ
Input1: \textscu   *Input2*: \;U
Sources: IPA '49–'96

'173 Turned small capital U
Input: \textturnscu
Sources:

'166 Lower-case V   *Usage*: voiced labiodental fricative
Input: v
Sources: IPA '49–'96

'126 Script V   *Usage*: labiodental approximant
Input1: \textscriptv   *Input2*: V
Sources: IPA '49–'96

'167 Lower-case W   *Usage*: voiced labio-velar approximant
Input: w
Sources: IPA '49–'96

'373 Turned W   *Usage*: voiceless labio-velar approximant
Input1: \textturnw   *Input2*: *w
Sources: IPA '49–'96

'170 Lower-case X   *Usage*: voiceless velar fricative
Input: x
Sources: IPA '49–'96

'130 Chi   *Usage*: voiceless uvular fricative
Input1: \textchi   *Input2*: X
Sources: IPA '49–'96

'171 Lower-case Y   *Usage*: close front rounded vowel
Input: y
Sources: IPA '49–'96

'114	Ⅎ	**Turned Y** *Usage*: palatal lateral approximant *Input1*: `\textturny` *Input2*: L *Sources*: IPA '49–'96
'131	Y	**Small Capital Y** *Usage*: close–close-mid front rounded vowel *Input1*: `\textscy` *Input2*: Y *Sources*: IPA '49–'96
'266	ய	**Left-hooktop Long Y**[25] *Input*: `\textlhtlongy` *Sources*:
'267	ய	**Viby Y**[26] *Input*: `\textvibyy` *Sources*:
'172	z	**Lower-case Z** *Usage*: voiced alveolar fricative *Input*: z *Sources*: IPA '49–'96
'336	ʑ	**Comma-tail Z** *Usage*: *as in *OHG* ëᴢᴢan 'to eat'. *Input*: `\textcommatailz` *Sources*:
Macro	Ž	**Z Wedge** *Usage*: *equivalent to IPA ʒ *Input*: `\v{z}` *Sources*:
'375	ʑ	**Curly-tail Z** *Usage*: voiced alveolo-palatal fricative *Input*: `\textctz` *Sources*: IPA '49–'96
'374	ʐ	**Right-tail Z** *Usage*: voiced retroflex fricative *Input1*: `\textrtailz` *Input2*: `\:z` *Sources*: IPA '49–'96
Macro	ƻ	**Crossed 2** *Input*: `\textcrtwo` *Sources*: IPA '49
'101	ↄ	**Turned two** *Input*: `\textturntwo` *Sources*:
'132	ʒ	**Yogh** *Usage*: voiced postalveolar fricative *Input1*: `\textyogh` *Input2*: Z *Sources*: IPA '49–'96
'102	ᶾ	**Bent-tail yogh** *Input*: `\textbenttailyogh` *Sources*:
'271	ƹ	**Reversed Yogh** *Input*: `\textrevyogh` *Sources*:

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[25]See explanations in footnote 21.
[26]See explanations in footnote 21.

'270   Curly-tail Yogh   *Usage*: palatalized ʒ
Input: \textctyogh
Sources: IPA '49, '79

'103   Turned three
Input: \textturnthree
Sources:

'120   Glottal Stop
Input1: \textglotstop   *Input2*: P
Sources: IPA '49–'96

'274   Superscript Glottal Stop
Input: \textraiseglotstop
Sources:

'334   Barred Glottal Stop   *Usage*: epiglottal plosive
Input: \textbarglotstop
Sources: IPA '89–'96

'333   Inverted Glottal Stop   *Usage*: alveolar lateral click
Input: \textinvglotstop
Sources: IPA '49, '79

Macro   Crossed Inverted Glottal Stop
Input: \textcrinvglotstop
Sources: IPA '49

'104   Curly-tail inverted glottal stop
Input: \textctinvglotstop
Sources:

'121   Reversed Glottal Stop   *Usage*: voiced pharyngeal fricative
Input1: \textrevglotstop   *Input2*: Q
Sources: IPA '49–'96

'105   Turned glottal stop (PSG 1996:211)
Input: \textturnglotstop
Sources:

'335   Barred Reversed Glottal Stop   *Usage*: voiced epiglottal fricative
Input: \textbarrevglotstop
Sources: IPA '89–'96

'174   Pipe   *Usage*: dental click
Input1: \textpipe   *Input2*: |
Sources: IPA '89–'96

'106   Pipe (a variety with no descender)
Input: \textpipevar
Sources:

'175   Double-barred Pipe   *Usage*: palatoalveolar click
Input: \textdoublebarpipe
Sources: IPA '89–'96

'110   Double-barred pipe (a variety with no descender)
Input: \textdoublebarpipevar
Sources:

'107		**Double pipe (a variety with no descender)** *Input*: \textdoublepipevar *Sources*:
'177		**Double Pipe** *Usage*: alveolar lateral click *Input1*: \textdoublepipe *Input2*: || *Sources*: IPA '89–'96
Macro		**Double-barred Slash** *Usage*: *a variant of ǂ *Input*: \textdoublebarslash *Sources*:
'041		**Exclamation Point** *Usage*: (post)alveolar click *Input*: ! *Sources*: IPA '89–'96

A.2   Suprasegmentals

'042		**Vertical Stroke (Superior)** *Usage*: primary stress *Input1*: \textprimstress *Input2*: " *Sources*: IPA '49–'96
'177		**Vertical Stroke (Inferior)** *Usage*: secondary stress *Input1*: \textsecstress *Input2*: "" *Sources*: IPA '49–'96
'072		**Length Mark** *Usage*: long *Input1*: \textlengthmark *Input2*: : *Sources*: IPA '49–'96
'073		**Half-length Mark** *Usage*: half-long *Input1*: \texthalflength *Input2*: ; *Sources*: IPA '49–'96
'222		**Vertical Line** *Usage*: minor (foot) group *Input*: \textvertline *Sources*: IPA '89–'96
'223		**Double Vertical Line** *Usage*: major (intonation) group *Input*: \textdoublevertline *Sources*: IPA '89–'96
'074		**Bottom Tie Bar** *Usage*: linking (absence of a break) *Input1*: \textbottomtiebar *Input2*: \t*{} *Sources*: IPA '89–'96
'224		**Down Arrow**[27] *Usage*: downstep *Input*: \textdownstep *Sources*: IPA '89–'96
'225		**Up Arrow** *Usage*: upstep *Input*: \textupstep *Sources*: IPA '89–'96

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[27]The shapes of \textdownstep and \textupstep differ according to sources. Here I followed the shapes found in the recent IPA charts.

'226	↘	**Downward Diagonal Arrow** *Usage*: global fall *Input*: `\textglobfall` *Sources*: IPA '89–'96
'227	↗	**Upward Diagonal Arrow** *Usage*: global rise *Input*: `\textglobrise` *Sources*: IPA '89–'96
'005	←	**Superscript left arrow** *Input*: `\textspleftarrow` *Sources*: *PSG*, p. 243
'007	↓	**Down full arrow** *Usage*: ingressive airflow *Input*: `\textdownfullarrow` *Sources*: ExtIPA
'010	↑	**Up full arrow** *Usage*: egressive airflow *Input*: `\textupfullarrow` *Sources*: ExtIPA
'011	→	**Suubscript right arrow** *Usage*: sliding articulation *Input*: `\textsubrightarrow` *Sources*: ExtIPA
'012	↔	**Suubscript double arrow** *Usage*: labial spreading *Input*: `\textsubdoublearrow` *Sources*: ExtIPA

A.3 Accents and Diacritics

'000	è	**Grave Accent** *Usage*: low tone *Input*: `\`e` *Sources*: IPA '49–'96
'001	é	**Acute Accent** *Usage*: high tone *Input*: `\'e` *Sources*: IPA '49–'96
'002	ê	**Circumflex Accent** *Usage*: falling tone *Input*: `\^e` *Sources*: IPA '49–'96
'003	ẽ	**Tilde** *Usage*: nasalized *Input*: `\~e` *Sources*: IPA '49–'96
'004	ë	**Umlaut** *Usage*: centralized *Input*: `\"e` *Sources*: IPA '49–'96
'005	e̋	**Double Acute Accent** *Usage*: extra high tone *Input*: `\H{e}` *Sources*: IPA '89–'96
'006	e̊	**Ring** *Input*: `\r{e}` *Sources*:

'007	ĕ	**Wedge** *Usage*: rising tone *Input*: `\v{e}` *Sources*: IPA '49–'96
'010	ĕ	**Breve** *Usage*: extra short *Input*: `\u{e}` *Sources*: IPA '49–'96
'011	ē	**Macron** *Input*: `\=e` *Sources*:
'012	ė	**Dot** *Input*: `\.e` *Sources*:
'013	ȩ	**Cedille** *Input*: `\c{e}` *Sources*:
'014	ę	**Polish Hook (Ogonek Accent)** *Input1*: `\textpolhook{e}` *Input2*: `\k{e}` *Sources*:
'000	ǫ	**Reversed Polish hook** *Input*: `\textrevpolhook{o}` *Sources*: *PSG*, p. 129
'015	ȅ	**Double Grave Accent** *Usage*: extra low tone *Input1*: `\textdoublegrave{e}` *Input2*: `\H*e` *Sources*: IPA '89–'96
'016	ȩ̀	**Subscript Grave Accent** *Usage*: low falling tone *Input1*: `\textsubgrave{e}` *Input2*: `\'*e` *Sources*: IPA '49, '79
'017	ȩ́	**Subscript Acute Accent** *Usage*: low rising tone *Input1*: `\textsubacute{e}` *Input2*: `\'*e` *Sources*: IPA '49, '79
Macro	ȩ̂	**Subscript Circumflex Accent** *Input1*: `\textsubcircum{e}` *Input2*: `\^*e` *Sources*:
'020	ĝ	**Round Cap** *Input1*: `\textroundcap{g}` *Input2*: `|c{g}` *Sources*:
Macro	á̄	**Acute Accent with Macron** *Input1*: `\textacutemacron{a}` *Input2*: `\'=a` *Sources*:
Macro	à̄	**Grave Accent with Macron** *Input*: `\textgravemacron{a}` *Sources*:
'234	a̓	**Vertical Bar Accent** *Input*: `\textvbaraccent{a}` *Sources*:

'235	ä̎	**Double Vertical Bar Accent** *Input*: `\textdoublevbaraccent{a}` *Sources*:
'236	è̇	**Grave Dot Accent** *Input1*: `\textgravedot{e}` *Input2*: `\`.e` *Sources*:
'237	é̇	**Dot Acute Accent** *Input1*: `\textdotacute{e}` *Input2*: `\'.e` *Sources*:
Macro	â̇	**Circumflex Dot Accent** *Input1*: `\textcircumdot{a}` *Input2*: `\^.a` *Sources*:
Macro	ã̇	**Tilde Dot Accent** *Input1*: `\texttildedot{a}` *Input2*: `\~.a` *Sources*:
Macro	ā̆	**Breve Macron Accent** *Input1*: `\textbrevemacron{a}` *Input2*: `\u=a` *Sources*:
Macro	ā̊	**Ring Macron Accent** *Input1*: `\textringmacron{a}` *Input2*: `\r=a` *Sources*:
Macro	š́	**Acute Wedge Accent** *Input1*: `\textacutewedge{s}` *Input2*: `\v's` *Sources*:
Macro	ă̇	**Dot Breve Accent** *Input*: `\textdotbreve{a}` *Sources*:
'021	t̪	**Subscript Bridge** *Usage*: dental *Input1*: `\textsubbridge{t}` *Input2*: `|[t` *Sources*: IPA '49–'96
'022	d̺	**Inverted Subscript Bridge** *Usage*: apical *Input1*: `\textinvsubbridge{d}` *Input2*: `|]t` *Sources*: IPA '89–'96
'023	n̻	**Subscript Square** *Usage*: laminal *Input*: `\textsubsquare{n}` *Sources*: IPA '89–'96
'024	o̜	**Subscript Right Half-ring**[28] *Usage*: more rounded *Input1*: `\textsubrhalfring{o}` *Input2*: `|)o` *Sources*: IPA '49–'96
'025	o̹	**Subscript Left Half-ring** *Usage*: less rounded *Input1*: `\textsublhalfring{o}` *Input2*: `|(o` *Sources*: IPA '49–'96

---

[28]Diacritics `\textsubrhalfring` and `\textsublhalfring` can be placed after a symbol by inputting, for example, `[e\textsubrhalfring{}]` [e̜].

'026	k̫	**Subscript W** *Usage*: labialized *Input1*: \textsubw{k} *Input2*: |w{k} *Sources*: IPA '79
'026	g̫	**Over W** *Usage*: *labialized *Input*: \textoverw{g} *Sources*:
'027	t̼	**Seagull** *Usage*: linguolabial *Input1*: \textseagull{t} *Input2*: |m{t} *Sources*: IPA '89–'96
'030	ẽ	**Over-cross** *Usage*: mid-centralized *Input1*: \textovercross{e} *Input2*: |x{e} *Sources*: IPA '49–'96
'033	ɔ̟	**Subscript Plus**[29] *Usage*: advanced *Input1*: \textsubplus{\textopeno} *Input2*: |+O *Sources*: IPA '49–'96
'034	ɛ̝	**Raising Sign** *Usage*: raised *Input1*: \textraising{\textepsilon} *Input2*: |'E *Sources*: IPA '49–'96
'035	e̞	**Lowering Sign** *Usage*: lowered *Input1*: \textlowering{e} *Input2*: |`e *Sources*: IPA '49–'96
'036	u̟	**Advancing Sign** *Usage*: advanced tongue root *Input1*: \textadvancing{u} *Input2*: |<u *Sources*: IPA '49–'96
'037	ə̠	**Retracting Sign** *Usage*: retracted tongue root *Input1*: \textretracting{\textschwa} *Input2*: |>@ *Sources*: IPA '49–'96
'003	ḛ	**Subscript Tilde** *Usage*: creaky voiced *Input1*: \textsubtilde{e} *Input2*: \~*e *Sources*: IPA '89–'96
'004	e̤	**Subscript Umlaut** *Usage*: breathy voiced *Input1*: \textsubumlaut{e} *Input2*: \"*e *Sources*: IPA '79, '89, '93
'006	u̥	**Subscript Ring** *Usage*: voiceless *Input1*: \textsubring{u} *Input2*: \r*u *Sources*: IPA '49–'96
'007	e̬	**Subscript Wedge** *Usage*: voiced *Input1*: \textsubwedge{e} *Input2*: \v*e *Sources*: IPA '49–'96
'011	e̱	**Subscript Bar** *Usage*: retracted *Input1*: \textsubbar{e} *Input2*: \=*e *Sources*: IPA '49–'96

[29]The diacritics such as \textsubplus, \textraising, \textlowering \textadvancing and \textretracting can be placed after a symbol by inputting [e\textsubplus{}] [e₊], for example.

'012 ẹ	Subscript Dot *Usage*: *retroflex *Input1*: `\textsubdot{e}` *Input2*: `\.*e` *Sources*:
'020 e̯	Subscript Arch *Usage*: non-syllabic *Input*: `\textsubarch{e}` *Sources*:
'042 m̩	Syllabicity Mark *Usage*: syllabic *Input1*: `\textsyllabic{m}` *Input2*: `\s{m}` *Sources*: IPA '49–'96
'046 t̴	Superimposed Tilde *Usage*: velarized or pharyngealized *Input1*: `\textsuperimposetilde{t}` *Input2*: `|~{t}` *Sources*: IPA '49–'96
'136 t̚	Corner *Usage*: no audible release *Input*: `t\textcorner` *Sources*: IPA '89–'96
'137 t̚	Open Corner *Usage*: *release/burst *Input*: `t\textopencorner` *Sources*:
'176 ɚ	Rhoticity *Usage*: rhoticity *Input*: `\textschwa\textrhoticity` *Sources*: IPA '89–'96
'040 b′	Celtic Palatalization Mark *Usage*: *as in *Irish* b′an 'woman'. *Input*: `b\textceltpal` *Sources*:
'275 k̥	Left Pointer *Input*: `k\textlptr` *Sources*:
'276 k̥	Right Pointer *Input*: `k\textrptr` *Sources*:
'004 p̘	Rectangle[30] *Usage*: *equivalent to IPA ˺ (Corner) *Input*: `p\textrectangle` *Sources*:
'006 ⊢	Retracting sign (a variety) *Input*: `\textretractingvar` *Sources*:
'076 g͡b	Top Tie Bar *Usage*: affricates and double articulations *Input1*: `\texttoptiebar{gb}` *Input2*: `\t{gb}` *Sources*:
'047 ʼ	Apostrophe *Usage*: ejective *Input*: `ʼ` *Sources*: IPA '49–'96

---

[30]This symbol is used among Japanese linguists as a diacritical symbol indicating no audible release (IPA ˺), because the symbol ˺ is used to indicate pitch accent in Japanese.

'134		**Reversed Apostrophe** *Usage*: aspirated *Input*: `\textrevapostrophe` *Sources*: IPA '49, '79
'056		**Period** *Usage*: syllable break as in [ɹi.ækt] *Input*: `.` *Sources*: IPA '89–'96
'043		**Hooktop** *Input*: `\texthooktop` *Sources*:
'044		**Right Hook** *Input*: `\textrthook` *Sources*:
'001		**Right Hook (long)** *Input*: `\textrthooklong` *Sources*:
'045		**Palatalization Hook** *Input*: `\textpalhook` *Sources*:
'002		**Palatalization hook (long)** *Input*: `\textpalhooklong` *Sources*:
'003		**Palatalization hook (a variety)** *Input*: `\textpalhookvar` *Sources*:
Macro	pʰ	**Superscript H** *Usage*: aspirated *Input1*: `p\textsuperscript{h}` *Input2*: `p\super h` *Sources*: IPA '49–'96
Macro	kʷ	**Superscript W** *Usage*: labialized *Input1*: `k\textsuperscript{w}` *Input2*: `k\super w` *Sources*: IPA '49–'96
Macro	tʲ	**Superscript J** *Usage*: palatalized *Input1*: `t\textsuperscript{j}` *Input2*: `t\super j` *Sources*: IPA '49–'96
Macro	tˠ	**Superscript Gamma** *Usage*: velarized *Input1*: `t\textsuperscript{\textgamma}` *Input2*: `t\super G` *Sources*: IPA '89–'96
Macro	dˤ	**Superscript Reversed Glottal Stop** *Usage*: pharyngealized *Input1*: `d\textsuperscript{\textrevglotstop}` *Input2*: `d\super Q` *Sources*: IPA '89–'96
Macro	dⁿ	**Superscript N** *Usage*: nasal release *Input1*: `d\textsuperscript{n}` *Input2*: `d\super n` *Sources*: IPA '89–'96
Macro	dˡ	**Superscript L** *Usage*: lateral release *Input1*: `d\textsuperscript{l}` *Input2*: `d\super l` *Sources*: IPA '89–'96

A.4 Tone letters

The tones illustrated here are only a representative sample of what is possible. For more details see the section entitled "Tone Letters" (page 17).

Macro
Extra High Tone
Input: \tone{55}
Sources: IPA '89–'96

Macro
High Tone
Input: \tone{44}
Sources: IPA '89–'96

Macro
Mid Tone
Input: \tone{33}
Sources: IPA '89–'96

Macro
Low Tone
Input: \tone{22}
Sources: IPA '89–'96

Macro
Extra Low Tone
Input: \tone{11}
Sources: IPA '89–'96

Macro
Falling Tone
Input: \tone{51}
Sources: IPA '89–'96

Macro
Rising Tone
Input: \tone{15}
Sources: IPA '89–'96

Macro
High Rising Tone
Input: \tone{45}
Sources: IPA '89–'96

Macro
Low Rising Tone
Input: \tone{12}
Sources: IPA '89–'96

Macro
High Rising Falling Tone
Input: \tone{454}
Sources: IPA '89–'96

A.5 Diacritics for ExtIPA, VoQS

In order to use diacritics listed in this section, it is necessary to specify the option 'extra' at the preamble (See the section entitled "Other options" on section 6.4). Note also that some of the diacritics are defined by using symbols from fonts other than TIPA so that they may not look quite satisfactory and/or may not be slanted (e.g. \whistle{s} s̹).

'011
Subscript double arrow   *Usage*: *labial spreading
Input: \spreadlips{s}
Sources: ExtIPA '94

Macro	V̪ (overbridge)	**Overbridge** *Usage*: *dentolabial *Input*: `\overbridge{v}` *Sources*: ExtIPA '94
Macro	n̪ (bibridge)	**Bibridge** *Usage*: *interdental/bidental *Input*: `\bibridge{n}` *Sources*: ExtIPA '94
Macro	t̳ (subdoublebar)	**Subscript Double Bar** *Usage*: *alveolar *Input*: `\subdoublebar{t}` *Sources*: ExtIPA '94
Macro	f̎ (subdoublevert)	**Subscript Double Vertical Line** *Usage*: *strong articulation *Input*: `\subdoublevert{f}` *Sources*: ExtIPA '94
Macro	V (subcorner)	**Subscript Corner** *Usage*: *weak articulation *Input*: `\subcorner{v}` *Sources*: ExtIPA '94
Macro	S↑ (whistle)	**Up Arrow** *Usage*: *whistled Articulation *Input*: `\whistle{s}` *Sources*: ExtIPA '94
'012	θS→ (sliding)	**Subscript right Arrow** *Usage*: *sliding articulation *Input*: `\sliding{\textipa{Ts}}` *Sources*: ExtIPA '94
Macro	m̸̃ (crtilde)	**Crossed tilde** *Usage*: *denasal *Input*: `\crtilde{m}` *Sources*: ExtIPA '94
Macro	ả̃ (dottedtilde)	**Dotted Tilde** *Usage*: *nasal escape *Input*: `\dottedtilde{a}` *Sources*: ExtIPA '94
Macro	S̃̃ (doubletilde)	**Double Tilde** *Usage*: *velopharyngeal friction *Input*: `\doubletilde{s}` *Sources*: ExtIPA '94
Macro	n̥ (partvoiceless)	**Parenthesis + Ring** *Usage*: *partial voiceless *Input*: `\partvoiceless{n}` *Sources*: ExtIPA '94
Macro	n̥ (inipartvoiceless)	**Parenthesis + Ring** *Usage*: *initial partial voiceless *Input*: `\inipartvoiceless{n}` *Sources*: ExtIPA '94
Macro	n̥ (finpartvoiceless)	**Parenthesis + Ring** *Usage*: *final partial voiceless *Input*: `\finpartvoiceless{n}` *Sources*: ExtIPA '94
Macro	S̬ (partvoice)	**Parenthesis + Subwedge** *Usage*: *partial voicing *Input*: `\partvoice{s}` *Sources*: ExtIPA '94
Macro	S̬ (inipartvoice)	**Parenthesis + Subwedge** *Usage*: *initial partial voicing *Input*: `\inipartvoice{s}` *Sources*: ExtIPA '94

S̬	**Parenthesis + Subwedge** *Usage*: *final partial voicing *Input*: `\finpartvoice{s}` *Sources*: ExtIPA '94

J	**Subscript Left Pointer** *Usage*: *right offset jaw voice *Input*: `\sublptr{J}` *Sources*: VoQS '94

J	**Subscript Right Pointer** *Usage*: *left offset jaw voice *Input*: `\subrptr{J}` *Sources*: VoQS '94

B   Changes from Version 1.0 to 1.1

B.1   Newly created symbols

The follwoing two symbols are newly adopted in the `tipa` encoding (i.e., T3).

    Hooktop right-tail D — ɖ̢
    Left-hooktop Long Y — ɥ

    The following command was realized by a macro in the previous version but now is assigned a code of its own in the `tipa` encoding (i.e., T3).

    Crossed lambda — ƛ

    The following symbols are (mostly) newly created symbols in the `tipx` fonts. (Note that some are moved from the `tipa` because of the encoding change.)

    Right-hook A — a̢
    Left-hook four — ₄
    Inverted script A — ɑ
    A-O Ligature — ɶ
    Inverted small capital A — Ɐ
    Small capital A-O Ligature — ᴁ
    Stretched C (original form) — ꞓ
    Curly-tail stretched C — ɕ
    Curly-tail stretched C (original form) — ɕ
    Front-hook D — ɗ
    Front-hook D (Original) — ɗ
    D-B ligature — ȸ
    Small capital Greek delta — ᴅ
    Right-hook E — e̢
    Right-hook epsilon — ɛ̢
    Small capital F — ꜰ
    Greek gamma — γ
    Front-tail gamma — ɣ
    Back-tail gamma — ɣ
    Right-tail hooktop H — ɦ̢
    Heng — ɧ
    Curly-tail J (a variety found in 1996 IPA) — ʝ
    Hooktop barred dotless J (a variety) — ʄ
    Small capital K — ᴋ
    Turned small capital K — ꓘ
    Reversed small capital L — ⅃
    H-M ligature — hn
    Small capital M — ᴍ
    Front-bar N — ꞥ
    Right leg N — ɳ
    Bull's eye (an old version) — ☉
    Female sign — ♀
    Uncrossed female sign — ♀
    Right-hook open O — ɔ̢

Inverted omega — ɷ
Left-hook P — ƥ
Small capital P — ᴘ
A variety of thorn (1) — þ
A variety of thorn (2) — þ
A variety of thorn (3) — þ
A variety of thorn (4) — þ
Q-P ligature — ɋp
Reversed small capital R — я
Reversed esh with top loop — ƪ
Front-hook T — ƫ
Curly-tail turned T — ʇ
Turned small capital U — ᴝ
Turned two — ᄅ
Bent-tail yogh — ᶾ
Turned three — ε
Curly-tail inverted glottal stop — ʕ
Turned glottal stop (PSG 1996:211) — ʔ
Pipe (a variety with no descender) — ǀ
Double pipe (a variety with no descender) — ǁ
Double-barred pipe (a variety with no descender) — ǂ
Superscript left arrow — ←
Down full arrow — ↓
Up full arrow — ↑
Subscript right arrow — →
Subscript double arrow — ↔
Reversed Polish hook — an accent command e.g., ǫ
Retracting sign (a variety) — ⊢
Right Hook (long) — ˻
Palatalization hook (long) — ˻
Palatalization hook (a variety) — ˻

B.2 Symbol shape changes

Shapes of the following symbols have been modified from the first version to the
present.

Name	Macro name	New	Old	Old symbol name
Pipe	\textpipe	ǀ	ǀ	\textpipevar
Double Pipe	\textdoublepipe	ǁ	ǁ	\textdoublepipevar
Double-barred pipe	\textdoublebarpipe	ǂ	ǂ	\textdoublebarpipevar
Down arrow	\textdownstep	↓	↓	\textdownfullarrow
Up arrow	\textupstep	↑	↑	\textupfullarrow
Bull's eye	\textbullseye	⊙	⊙	\textObullseye
Hooktop barred dotless J	\texthtbardotlessj	ʄ	ʄ	\texthtbardotlessjvar

For each symbol, the old shape is preserved in the `tipx` fonts and can be
accessed by a new name (in most cases `var` or `O` is attached) indicated at the
rightmost column of the above table.

C   Symbols not included in **TIPA**

Although the present version of **TIPA** includes almost all the symbols found in *PSG* and *Handbook*, there are still some symbols not included or defined in **TIPA**.

Some of such symbols can be realized by writing appropriate macros, while some others cannot be realized without resorting to the Metafont.

This section discusses these problems by classifying such symbols into three categories, as shown below.

(1) Symbols that can be realized by T_EX's macro level and/or by using symbols from other fonts.

(2) Symbols that can be imitated by T_EX's macro level and/or by using symbols from other fonts (but may not look quite satisfactory).

(3) Symbols that cannot be realized at all, without creating a new font.

With the addtion of the **TIPX** fonts, symbols that belong to the third category are virtually non-existent now.

As for the symbols that belong to the first and second categories, **TIPA** provides a variety of macros and parts of symbols that can be used to compose a desired symbol if you can write an appropriate macro for it.

The following table shows symbols that belong to the first category. For each symbol, an example of input method and its output is also given. Note that barred or crossed symbols can be easily made by **TIPA**'s \ipabar macro.

Barred Small Capital I	\ipabar{\textsci}{.5ex}{1.1}{}{}	ɪ̶
Barred J	\ipabar{j}{.5ex}{1.1}{}{}	ɟ
Crossed K	\ipabar{k}{1.2ex}{.6}{}{.4}	k̵
Barred Open O	\ipabar{\textopeno}{.5ex}{.6}{.4}{}	ɔ̵
Barred Small Capital Omega	\ipabar{\textscomega}{.5ex}{1.1}{}{}	ɷ̶
Barred P	\ipabar{p}{.5ex}{1.1}{}{}	ᵽ
Half-barred U	\ipabar{u}{.5ex}{.5}{}{.5}	ʉ
Barred Small Capital U	\ipabar{\textscu}{.5ex}{1.1}{}{}	ᴜ̶
Double Slash	/\kern-.25em/	//
Triple Slash	/\kern-.25em/\kern-.25em/	///

The next definitions attaches a tiny 'left hook' (which shows palatalization) to a symbol. For example:

```
% Left-hook B
\newcommand\textlhookb{{\tipaencoding
  b\hspace{-.15em}\raisebox{.0ex}{\textpalhookvar}}}
% Left-hook M
\newcommand\textlhookm{{\tipaencoding
  m\hspace{-.15em}\raisebox{.0ex}{\textpalhook}}}
```

The former example uses a left-hook called \textpalhookvar, (ʯ) and latter uses a hook called \textpalhook, (ʮ).

Left-hook B — ḇ
Left-hook M — m̡

Symbols that belong to the second category are shown below. Note that slashed symbols can be in fact easily made by a macro. For example, a slashd b i.e., ɸ can be made by `\ipaclap{\textipa{b}}{\textipa{/}}`. The reason why slashed symbols are not included in TIPA is as follows: first, a simple overlapping of a symbol and a slash does not always result in a good shape, and secondly, it doesn't seem significant to devise fine-tuned macros for symbols which were created essentialy for typewriters.

Slashed B	ƀ
Slashed C	¢
Slashed D	đ
Slashed U	ʉ
Slashed W	₩

D Specimens

This section displays all the symbols included in the TIPA font families. Sample texts are taken from the *Principles* (1949). The languages taken up here include: One variety of Southern British English (in a narrower transcription), one form of Parisian French, one variety of North German (in a narrower transcription), Cairene Arabic (spoken language) and Swahili of Zanzaibar.

D.1 tipa10 and tipx10

` ´ ˆ ˜ ¨ ˝ ˚ ˇ ˘ ¯ ˙ ᪷ ᪸ ˝ ` ´ ˆ ⌐ ⌐ ⌐ ᪸ ᪷ ᪷ ᪸ ˣ 1 ɟ ᵼ ᵼ ᵼ ᵼ ´ ! ' ` ᪷ ᪸ ˜ ' ( ) * + , - .
/ ʮ ɨ ʌ ɜ ɥ ʁ ɒ ɤ ʘ ɘ ː · ‿ = ⁀ ʔ ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɪ j ʁ ʌ m ŋ ɔ ʔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ
ʏ ʒ [` ] ⌐ ⌐ ` 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 ‖ | ‡ �· ᪷ ᪸ ˜ ˜ ᪷ ᪸ ˜ ˜
/ ᪷ ᪸ ˜ ˜ ᪷ ᪸ ˜ ˜ / | ‖ ↓ ↑ ↗ ↘ ´ ˇ ˜ ˜ ' " ˘ ˝ ᵺ ᶑ ᶑ ʥ ɛ ɡ ɟ ɟ ɟ ʁ ʈ ɬ λ ƛ ꞯ ɳ æ ω ʊ ʃ ʦ ʧ ʦ
ʮ ʯ ʓ ʑ ʙ ʙ ˀ ˁ | ᴀ ᴄ ʆ ʤ ɝ ɞ ɞ ɞ ᴙ ɕ ɦ ʜ ɿ ʄ ꭄ ʟ ʩ θ β ʠ ɺ ʎ ɪ ɾ œ ɷ ʧ ʊ ʌ ʔ ʕ ʑ ʙ ʙ
ɓ ɗ ᶁ ɠ ɢ æ ç ħ ʄ ʄ ɬ ɬ ʟ ᵿ ɳ ɴ ɲ Ɵ ʈ ɿ ɽ ʀ œ ø ʂ ᶊ ʍ ʐ ʑ þ ɸ

˳ ᵤ ᵤ ᵤ ᵈ ← ↦ ↓ ↑ ʔ̩ ɑ ɐ æ ɟ c ʆ ʓ ʓ ç ᶁ ᶑ ᶑ ʤ ᵹ ᵹ γ γ γ ɦ ʜ ɿ ʄ ʃ ꞁ m n ŋ ɋ ɋ ⊙ ʚ ɷ p ɸ ʄ ɬ ʈ ᶁ
ʐ ʓ ɕ ɕ ᶘ ᶙ | ‖ ‡ þ ƕ þ þ ᴠ ᴀ ᴅ ꜰ ᴋ ᴋ ᴊ ᴍ ʀ ʠ ᴙ ᴨ

ðə ˈnɔˑθ ˈwɪnd ənd ðə ˈsʌn wə dɪsˈpjuˑtɪŋ wɪtʃ wəz ðə ˈstrɒŋgɐ, wɛn ə ˈtrævlɐ keɪm əˈlɒŋ ˈræpt m ə ˈwɔːm ˈkloʊk. ðeɪ əˈgriːd ðət ðə ˈwʌn huˑ ˈfɜˑst səkˈsiˑdɪd ɪn ˈmeɪkɪŋ ðə ˈtrævlɐ teɪk hɪz ˈkloʊk ɒf ʃʊd bɪ kənˈsɪdəd ˈstrɒŋgə ðən ðɪ ˈʌðə.

D.2 tipa12 and tipx12

` ´ ˆ ˜ ¨ ˝ ˚ ˇ ˘ ¯ ˙ ᪷ ᪸ ˝ ` ´ ˆ ⌐ ⌐ ⌐ ᪸ ᪷ ᪷ ᪸ ˣ 1 ɟ ᵼ ᵼ ᵼ ᵼ ´ ! ' ` ᪷ ᪸ ˜ '
( ) * + , - . / ʮ ɨ ʌ ɜ ɥ ʁ ɒ ɤ ʘ ɘ ː · ‿ = ⁀ ʔ ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɪ j ʁ ʌ
m ŋ ɔ ʔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ [` ] ⌐ ⌐ ` 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 ‖ | ‡ �· ᪷ ᪸ ˜ ˜ ᪷ ᪸ ˜ ˜ / ᪷ ᪸ ˜ ˜ ᪷ ᪸ ˜ ˜ / | ‖ ↓ ↑ ↗ ↘ ´ ˇ ˜ ˜ '
" ˘ ˝ ᵺ ᶑ ᶑ ʥ ɛ ɡ ɟ ɟ ɟ ʁ ʈ ɬ λ ƛ ꞯ ɳ æ ω ʊ ʃ ʦ ʧ ʦ ʮ ʯ ʓ ʑ ʙ ʙ ˀ ˁ | ᴀ ᴄ
ʆ ʤ ɝ ɞ ɞ ɞ ᴙ ɕ ɦ ʜ ɿ ʄ ꭄ ʟ ʩ θ β ʠ ɺ ʎ ɪ ɾ œ ɷ ʧ ʊ ʌ ʔ ʕ ʑ ʙ ɓ ɗ ᶁ ɠ
ɢ æ ç ħ ʄ ʄ ɬ ɬ ʟ ᵿ ɳ ɴ ɲ Ɵ ʈ ɿ ɽ ʀ œ ø ʂ ᶊ ʍ ʐ ʑ þ ɸ

˳ ᵤ ᵤ ᵤ ᵈ ← ↦ ↓ ↑ ʔ̩ ɑ ɐ æ ɟ c ʆ ʓ ʓ ç ᶁ ᶑ ᶑ ʤ ᵹ ᵹ γ γ γ ɦ ʜ ɿ ʄ ʃ ꞁ m n ŋ ɋ ɋ ⊙ ʚ
ɷ p ɸ ʄ ɬ ʈ ᶁ ʐ ʓ ɕ ɕ ᶘ ᶙ | ‖ ‡ þ ƕ þ þ ᴠ ᴀ ᴅ ꜰ ᴋ ᴋ ᴊ ᴍ ʀ ʠ ᴙ ᴨ

la biːz e l sɔlɛˑj sə dispytɛ, ʃakœ̃ asyrã k il etɛ l ply fɔːr, kãt iz õ vy œ̃ vwajaʒœːr ki s avãsɛ, ãvlɔpe dã sõ mãto. i sõ tõbe dakɔːr, kə səlyi ki arivɛ l prəmje a fɛr ote sõ mãto o vwajaʒœːr, sərɛ rgarde kɔm l ply fɔːr.

D.3 tipa17 and tipx17

` ´ ˆ ˜ ¨ ˝ ˚ ˇ ˘ ¯ ˙ ᪷ ᪸ ˝ ` ´ ˆ ⌐ ⌐ ⌐ ᪸ ᪷ ᪷ ᪸ ˣ 1 ɟ ᵼ
ᵼ ᵼ ᵼ ´ ! ' ` ᪷ ᪸ ˜ ' ( ) ᪷ * + , - . / ʮ ɨ ʌ ɜ ɥ ɒ ɤ ɣ θ
ɘ ː · ‿ = ⁀ ʔ ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɪ j ʁ ʌ m ŋ ɔ ʔ ʕ ɾ

ˈʔaɪnst ˈʃtrɪtən zɪç ˈnɔʁtvɪnt ʔʊnt ˈzɔnə, ˈveːʁ fɔn
ʔiˑnən ˈbaɪdən voːl deʁ ˈʃtɛʁkəʁə veːʁə, ʔals ʔaɪn
ˈvandəʁəʁ, deːʁ ʔɪn ʔaɪnən vaʁmən ˈmantəl
gəˈhʏlt vaːʁ, dəs veːgəs daːˈheːʁ kaːm. ziˑ vʊʁdən
ˈʔaɪnɪç, das ˈdeːʁjeːnɪgə fyːʁ dən ˈʃtɛʁkəʁən
gɛltən zɔltə, deːʁ dən ˈvandəʁəʁ ˈtsvɪŋən vyʁdə,
zaɪnən ˈmantəl ˈʔaptsuˑneːmən.

D.4 `tipa8` and `tipx8`

marra ʃ ʃamsi wi r riːħ kaːnu bi jitxanʔum ʔinhu l ʔaʔwa fiːhum. u baʕdeːn ʃaːfu raːgil saːjiħ
gaj mim baʕiːd mitlaffaʕ bi ʕabaːja tʔiːla. fa ttafaʔum ʕala ʔin illi jixalliːh jiʔlaʕ il ʕabaːja fi
l ʔawwal jikuːn huwwa ʔaʔwa mit taːni.

D.5 `tipa9` and `tipx9`

ᶏ ɘ ɞ ɜ̇ ɤ ɕ ʄ ɦ ɦ ɪ ɟ ʞ ʟ ʪ ɫ ʆ ꭥ ɓ ꞵ ɗ ʄ ʃ ɭ ʈ œ ɿ ʧ ʊ ʂ ʔ ꞓ ʐ ʙ ʙ ɓ ɗ ɖ ɟ ʛ ɢ æ ç ħ ɟ ɟ ɬ ɫ ǀ ɰ ɳ ɴ ɲ Ɵ ʀ ɹ ɻ ʁ œ ø ʂ ʈ ʍ ʑ ʐ þ ɻ
Ɵ ɽ ɺ ʀ œ ø ʂ ʈ ʍ ʑ ʐ þ ɻ

(first symbol specimen block)

upepo ulikuwa ukiɓiʃana na ɟua kuwa nani mweŋe ŋguvu kupita mwenziwe, mara
akapita masafiri alijekuwa amevaa ɟuɓa. walipatana kuwa atakajemvua ɟuɓa kwanza
msafiri ndije mweŋe ŋguvu.

D.6   `tipabx10` and `tipxbx10`

(symbol specimen block)

ðə ˈnɔ·θ ˈwɪnd ənd ðə ˈsʌn wə dɪsˈpjuˑtɪŋ wɪtʃ wəz ðə ˈstrɒŋgə, wɛn ə
ˈtrævlə keɪm əˈlɒŋ ˈræpt ɪn ə ˈwɔːm ˈkloʊk. ðeɪ əˈgriːd ðət ðə ˈwʌn
huˑ fɝˑst səkˈsiˑdɪd ɪn ˈmeɪkɪŋ ðə ˈtrævlə teɪk hɪz ˈkloʊk ɒf ʃʊd bɪ
kənˈsɪdəd ˈstrɒŋgə ðən ði ˈʌðə.

D.7   `tipabx12` and `tipxbx12`

(symbol specimen block)

la biːz e l sɔlɛːj sə dispytɛ, ʃakœ̃ asyrɑ̃ k il etɛ l ply fɔːr,
kɑ̃t iz ɔ̃ vy œ vwajaʒœːr ki s avɑ̃sɛ, ɑ̃vlɔpe dɑ̃ sɔ̃ mɑ̃to. i
sɔ̃ tɔ̃be dakɔːr, kə səlyi ki arivɛ l prəmje a fɛr ote sɔ̃ mɑ̃to
o vwajaʒœːr, sərɛ rgarde kɔm l ply fɔːr.

D.8 `tipabx8` and `tipxbx8`

(IPA font glyph table)

(IPA font glyph table)

ˈʔaɪnst ʃtʀɪtən zɪç ˈnɔʁtvɪnt ʔʊnt ˈzɔnə, ˈveːʁ fɔn ʔiˈnən ˈbaɪdən voːl dɐʁ ˈʃtɛʁkeʁə veːʁə, ʔals ʔaɪn ˈvandeʁeʁ, deːʁ ʔɪn ʔaɪnən vaʁmən ˈmantəl gəˈhʏlt vaːʁ, dəs veːɡəs daːˈheːʁ kaːm. ziˑ vʊʁdən ˈʔaɪnɪç, das ˈdeːʁjeːnɪɡə fyːʁ dən ˈʃtɛʁkeʁən ɡɛltən zɔltə, deːʁ dən ˈvandeʁeʁ ˈtsvɪŋən vyʁdə, zaɪnən ˈmantəl ˈʔaptsuˑneːmən.

D.9 `tipabx9` and `tipxbx9`

(IPA font glyph table)

(IPA font glyph table)

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marra ʃ ʃamsi wi r riːħ kaːnu bi jitxanʔum ʔinhu l ʔaʔwa fiːhum. u baʕdeːn ʃaˑfu raːgil saːjiħ gaj mim baʕiːd mitlaffaʕ bi ʕabaːja tʔiːla. fa ttafaʔum ʕala ʔin illi jixalliːh jiʔlaʕ il ʕabaːja fi l ʔawwal jikuːn huwwa ʔaʔwa mit taːni.

D.10 `tipasl10` and `tipxsl10`

(IPA font glyph table)

(IPA font glyph table)

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upepo ulikuwa ukiɓiʃana na ɟua kuwa nani mweŋe ŋguvu kupita mwenziwe, mara akapita masafiri alijekuwa amevaa ɟuɓa. walipatana kuwa atakajemvua ɟuɓa kwanza msafiri ndije mweŋe ŋguvu.

D.11   `tipasl12` and `tipxsl12`

ˋ ˊ ˆ ˜ ¨ ˝ ˚ ˘ ˬ ‐ · ˌ ˏ " ˋ ˊ ˆ ˜ ˞ ˠ ˤ ˓ ˒ × ʃ ʝ ˔ ˕ ˦ ˧ ˨ ˩ ´ ! ˈ ˞ ˜ ˒
( ) * + , - . / ʮ ɨ ʌ ʒ ʯ ɐ ɒ ɣ θ ɘ ə : · ‿ = ͡ ʔ ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ ɟ ʁ ʎ
ɱ ŋ ɔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ ['] ˥ ˩ ' 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 ‖ | ‡ ˜ ˌ ˍ ˎ ˏ ˑ ˒ ˓ ˔ ˕ ˖ ˗ ˘ ˙ ↓ ↑ ↗ ↘ ˊ ˋ ˆ ˜ ˊ ˋ
" ˷ ˮ ƀ d ɖ ɟ ɛ g ɟ ɟ ɹ ɥ ɬ λ ʎ ɧ ɳ æ ω ɒ ʃ ʈ ʧ ʦ ʮ ʯ ʒ ʑ ʙ ? ˂ ˃ | ʌ ꞓ
ʗ ʤ ɝ ɞ ɜ ɝ ʛ ɕ ɦ ɪ ʝ ʞ ʟ ɭ ɠ β ɗ ɟ ɪ ʈ œ ɿ ʧ ʊ ʃ ʔ ʕ z ʙ ʙ ɓ ɗ ɟ
ɢ æ ç ħ ɟ ɟ ɬ ɬ ɭ ɰ ɳ ɴ ɲ ⊙ ɺ ɹ ɻ ʀ œ ø ʂ ʈ ɰ ʐ ʑ þ ʪ

ˌ ˌ ˌ ˌ ˌ ˌ ◌ ← ↦ ↓ ↑ ↑ a̯ ɑ æ ꝯ ɕ ʗ ɕ ꞔ d ˈd ꭎ e̯ ɛ̯ ɣ ɣ ɣ ɦ̩ ʰ ɪ̯ ɟ ʃ ʰn ɴ ɳ ʚ ʚ ⊙ ɞ
ω ꝙ ꝙ ɺ ꞎ ɟ ɿ ɿ ʒ ʒ ʓ ɕ ᶑ ɀ | ‖ ‡ þ ꝥ ꝥ ꝥ ʌ Ꝺ ∆ ꜰ ᴋ ᴊ ᴍ ᴘ ꞯ ᴙ ᴖ

ðə ˈnɔ·θ ˈwɪnd ənd ðə ˈsʌn wə dɪsˈpjuˑtɪŋ wɪtʃ wəz ðə ˈstrɒŋgɚ, wɛn ə
ˈtrævlɚ keɪm əˈlɒŋ ˈræpt ɪn ə ˈwɔːm ˈkloʊk. ðeɪ əˈgriːd ðət ðə ˈwʌn
huˑ ˈfɜˑst səkˈsiˑdɪd ɪn ˈmeɪkɪŋ ðə ˈtrævlɚ teɪk hɪz ˈkloʊk ɒf ʃʊd bɪ
kənˈsɪdəd ˈstrɒŋgə ðən ðɪ ˈʌðə.

D.12   `tipasl8` and `tipxsl8`

ˋ ˊ ˆ ˜ ¨ ˝ ˚ ˘ ˬ ‐ · ˌ ˏ " ˋ ˊ ˆ ˜ ˞ ˠ ˤ ˓ ˒ × ʃ ʝ ˔ ˕ ˦ ˧ ˨ ˩ ´ ! ˈ ˞ ˜ ' ( ) * + , - . / ʮ ɨ ʌ ʒ ʯ ɐ ɒ
ɣ θ ɘ : ‿ = ͡ ʔ ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ ɟ ʁ ʎ ɱ ŋ ɔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ ['] ˥ ˩ ' 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 ‖ | ‡ ˜ ˌ ˍ ˎ ˏ ˑ ˒ ˓ ˔ ˕ ˖ ˗ ˘ ˙ ↓ ↑ ↗ ↘ ˊ ˋ ˆ ˜ ˊ ˋ ' " ˷ ˮ ƀ d
ɖ ɟ ɛ g ɟ ɟ ɹ ɥ ɬ λ ʎ ɧ ɳ æ ω ɒ ʃ ʈ ʧ ʦ ʮ ʯ ʒ ʑ ʙ ? ˂ ˃ | ʌ ꞓ ʗ ʤ ɝ ɞ ɜ ɝ ʛ ɕ ɦ ɪ ʝ ʞ ʟ ɭ ɠ β ɗ ɟ
ɿ ʈ œ ɿ ʧ ʊ ʃ ʔ ʕ z ʙ ʙ ɓ ɗ ɟ ɢ æ ç ħ ɟ ɟ ɬ ɬ ɭ ɰ ɳ ɴ ɲ ⊙ ɺ ɹ ɻ ʀ œ ø ʂ ʈ ɰ ʐ ʑ þ ʪ

ˌ ˌ ˌ ˌ ˌ ˌ ◌ ← ↦ ↓ ↑ ↑ a̯ ɑ æ ꝯ ɕ ʗ ɕ ꞔ d ˈd ꭎ e̯ ɛ̯ ɣ ɣ ɣ ɦ̩ ʰ ɪ̯ ɟ ʃ ʰn ɴ ɳ ʚ ʚ ⊙ ɞ ω ꝙ ꝙ ɺ ꞎ ɟ ɿ ɿ ʒ ʒ ʓ ɕ ᶑ ɀ | ‖ ‡
þ ꝥ ꝥ ꝥ ʌ Ꝺ ∆ ꜰ ᴋ ᴊ ᴍ ᴘ ꞯ ᴙ ᴖ

la biːz e l sɔlɛːj sə dispytɛ, ʃakœ̃ asyrɑ̃ k il etɛ l ply fɔːr, kɑ̃t iz ɔ̃ vy œ̃ vwajaʒœːr ki s avɑ̃sɛ,
ɑ̃vlɔpe dɑ̃ sɔ̃ mɑ̃to. i sɔ̃ tɔ̃be dakɔːr, kə səlyi ki arivɛ l prəmje a fɛr ote sɔ̃ mɑ̃to o vwajaʒœːr,
sœrɛ rgarde kɔm l ply fɔːr.

D.13   `tipasl9` and `tipxsl9`

ˋ ˊ ˆ ˜ ¨ ˝ ˚ ˘ ˬ ‐ · ˌ ˏ " ˋ ˊ ˆ ˜ ˞ ˠ ˤ ˓ ˒ × ʃ ʝ ˔ ˕ ˦ ˧ ˨ ˩ ´ ! ˈ ˞ ˜ ' ( ) * + , - . / ʮ ɨ ʌ
ʒ ʯ ɐ ɒ ɣ θ ɘ : · ‿ = ͡ ʔ ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ ɟ ʁ ʎ ɱ ŋ ɔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ ['] ˥ ˩ ' 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 ‖ | ‡ ˜ ˌ ˍ ˎ ˏ ˑ ˒ ˓ ˔ ˕ ˖ ˗ ˘ ˙ ↓ ↑
↗ ↘ ˊ ˋ ˆ ˜ ˊ ˋ ' " ˷ ˮ ƀ d ɖ ɟ ɛ g ɟ ɟ ɹ ɥ ɬ λ ʎ ɧ ɳ æ ω ɒ ʃ ʈ ʧ ʦ ʮ ʯ ʒ ʑ ʙ ? ˂ ˃ | ʌ ꞓ ʗ ʤ
ɝ ɞ ɜ ɝ ʛ ɕ ɦ ɪ ʝ ʞ ʟ ɭ ɠ β ɗ ɟ ɿ ʈ œ ɿ ʧ ʊ ʃ ʔ ʕ z ʙ ʙ ɓ ɗ ɟ ɢ æ ç ħ ɟ ɟ ɬ ɬ ɭ ɰ ɳ ɴ ɲ
⊙ ɺ ɹ ɻ ʀ œ ø ʂ ʈ ɰ ʐ ʑ þ ʪ

ˌ ˌ ˌ ˌ ˌ ˌ ◌ ← ↦ ↓ ↑ ↑ a̯ ɑ æ ꝯ ɕ ʗ ɕ ꞔ d ˈd ꭎ e̯ ɛ̯ ɣ ɣ ɣ ɦ̩ ʰ ɪ̯ ɟ ʃ ʰn ɴ ɳ ʚ ʚ ⊙ ɞ ω ꝙ ꝙ ɺ ꞎ ɟ ɿ ɿ ʒ ʒ ʓ ɕ
ᶑ ɀ | ‖ ‡ þ ꝥ ꝥ ꝥ ʌ Ꝺ ∆ ꜰ ᴋ ᴊ ᴍ ᴘ ꞯ ᴙ ᴖ

ˈʔaɪnst ʃtʁɪtən zɪç ˈnɔʁtvɪnt ʔʊnt ˈzɔnə, ˈveːʁ fɔn ʔiˑnən ˈbaɪdən voːl dɐʁ ˈʃtɛʁkɐʁə
veːʁə, ʔals ʔaɪn ˈvandɐʁɐʁ, deːʁ ʔɪn ʔaɪnən vaʁmən ˈmantəl gəˈhʏlt vaːʁ, dəs veːgəs
daːˈheːʁ kaːm. ziˑ vʊʁdən ˈʔaɪnɪç, das ˈdeːʁjeːnɪgə fyːʁ dən ˈʃtɛʁkɐʁən gɛltən zɔltə,
deːʁ dən ˈvandɐʁɐʁ ˈtsvɪŋən vyʁdə, zaɪnən ˈmantəl ˈʔaptsuˑneːmən.

D.14 tipass10 and tipxss10

` ´ ^ ˜ ¨ ˝ ˳ ˚ ˘ ˇ ¯ · ˙ ‚ ‛ ʼ ʻ ˎ ˏ ˷ ˓ ˵ ˶ ˞ ˟ ˭ ˀ ˔ ˕ ˒ ʹ ! ˈ ˋ ˜ ʼ ( ) * + , - .
/ ʜ ɟ ʌ ɜ ɥ ɐ ɒ ɤ ɵ ə : · ‿ = ‾ ? ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɪ ɟ ʁ ʌ ɱ ɲ ŋ ɔ ? ˤ ɾ ʃ θ ʊ ʋ ɯ χ ʏ
ʒ ['] ˞ ʳ ʻ 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 ‖ ⫽ ‡ ˆ ⸳ ⸗ ⸜ ⸝ ⸍ ⸌ ⸌ ⸝ ⸜ ⸍ - ˻
⸜ ⸝ ⸍ ⸌ ⫽ ‖ ↓ ↑ ↗ ↘ ´ ˇ ˝ ˜ ' " ˘ ˝ ɓ ɗ ɖ ɢ ɛ ɢ g ʅ ʅ ʄ ʞ + ʎ ⅄ ʒ ɳ æ ω Ω ʃ ʈ ʈ ʦ ʮ ʯ
ʒ ɛ ʒ ʕ ʔ ? ˤ ˂ ˃ l ʌ ɕ ʆ ʤ ʁ ɵ ɞ ɞ ɝ ɤ ɕ ɦ ʜ ɪ ʄ ʞ ʟ ʐ ɵ ɸ ɗ ɾ ʆ ꜰ œ ɜ ʧ ʊ ʃ ? ꜰ ʐ ᴘ ʙ ɓ ɗ ɗ
ɟ ɢ æ ç ħ ɟ ʃ ⱦ ⱡ ɰ ɰ ɴ ɳ Ɵ ⱦ ɺ ɺ ʀ œ ø ʂ ʈ ʍ ʑ ⱬ þ ⱨ

˾ ⸝ ⸌ ⸝ ˷ ˹ ˾ ◌̼ ꜏ ˗ ↓ ↑ ꞎ ɑ ɒ ᴔ ꜵ ꜿ ɕ ꜿ ꜿ ꜵ ꝱ ꝺ ꝺ ꝼ ꜫ ꜯ ɣ ꝿ ꝿ ꝿ ꜧ ꜧ ꝭ ꜩ ʍ ɳ ɳ ꝗ ꝙ ꝙ ◌͡ ꜿ ꝳ ɱ ꝓ ꝓ ⱡ ⱦ ꜩ
ʒ ꜩ ꜯ ꜩ ꜫ ꜛ ꜙ ‖ ‖ ‡ ꝑ ꝑ ꝑ ꝓ ꝺ ꜹ ᴧ ᴅ ꜰ ꜱ ꝗ ᴊ ᴑ ᴘ ꝗ ꝗ ꝸ

marra ʃ ʃamsi wi r ri:ħ ka:nu bi jitxanʔum ʔinhu l ʔaʔwa fi:hum. u baʕde:n
ʃa:fu ra:gil sa:jiħ gaj mim baʕi:d mitlaffaʕ bi ʕaba:ja tʔi:la. fa ttafaʔum ʕala
ʔin illi jixalli:ħ jiʔlaʕ il ʕaba:ja fi l ʔawwal jiku:n huwwa ʔaʔwa mit ta:ni.

D.15 tipass12 and tipxss12

` ´ ^ ˜ ¨ ˝ ˳ ˚ ˘ ˇ ¯ · ˙ ‚ ‛ ʼ ʻ ˎ ˏ ˷ ˓ ˵ ˶ ˞ ˟ ˭ ˀ ˔ ˕ ˒ ʹ ! ˈ ˋ ˜ ʼ
( ) * + , - . / ʜ ɟ ʌ ɜ ɥ ɐ ɒ ɤ ɵ ə : · ‿ = ‾ ? ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɪ ɟ ʁ ʌ
ɱ ɲ ŋ ɔ ? ˤ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ ['] ˞ ʳ ʻ 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 ‖ ⫽ ‡ ˆ ⸳ ⸗ ⸜ ⸝ ⸍ ⸌ ⸌ ⸝ ⸜ ⸍ - ˻ ⸜ ⸝ ⸍ ⸌ ⫽ ‖ ↓ ↑ ↗ ↘ ´ ˇ ˝ ˜ ' "
˘ ˝ ɓ ɗ ɖ ɢ ɛ ɢ g ʅ ʅ ʄ ʞ + ʎ ⅄ ʒ ɳ æ ω Ω ʃ ʈ ʈ ʦ ʮ ʯ ʒ ɛ ʒ ʕ ʔ ? ˤ ˂ ˃ l ʌ ɕ ʆ
ʤ ʁ ɵ ɞ ɞ ɝ ɤ ɕ ɦ ʜ ɪ ʄ ʞ ʟ ʐ ɵ ɸ ɗ ɾ ʆ ꜰ œ ɜ ʧ ʊ ʃ ? ꜰ ʐ ᴘ ʙ ɓ ɗ ɗ ɟ ɢ æ ç
ħ ɟ ʃ ⱦ ⱡ ɰ ɰ ɴ ɳ Ɵ ⱦ ɺ ɺ ʀ œ ø ʂ ʈ ʍ ʑ ⱬ þ ⱨ

˾ ⸝ ⸌ ⸝ ˷ ˹ ˾ ◌̼ ꜏ ˗ ↓ ↑ ɑ ɒ ᴔ ꜵ ꜿ ɕ ꜿ ꜿ ꜵ ꝱ ꝺ ꝺ ꝼ ꜫ ꜯ ɣ ꝿ ꝿ ꝿ ꜧ ꜧ ꝭ ꜩ ʍ ɳ ɳ ꝗ ꝙ ꝙ ◌͡ ꜿ
ɱ ꝓ ꝓ ⱡ ⱦ ꜩ ʒ ꜩ ꜯ ꜩ ꜫ ꜛ ꜙ ‖ ‖ ‡ ꝑ ꝑ ꝑ ꝓ ꝺ ꜹ ᴧ ᴅ ꜰ ꜱ ꝗ ᴊ ᴑ ᴘ ꝗ ꝗ ꝸ

upepo ulikuwa ukiɓiʃana na ɟua kuwa nani mweŋe ŋguvu kupita
mwenziwe, mara akapita masafiri alijekuwa amevaa ɟuɓa. walipatana
kuwa atakajemvua ɟuɓa kwanza msafiri ndije mweŋe ŋguvu.

D.16 tipass17 and tipxss17

` ´ ^ ˜ ¨ ˝ ˳ ˚ ˘ ˇ ¯ · ˙ ‚ ‛ ʼ ʻ ˎ ˏ ˷ ˓ ˵ ˶ ˞ ˟ ˭ ˀ ˔ ˕ ˒ ʹ ! ˈ ˋ ˜ ʼ
( ) * + , - . / ʜ ɟ ʌ ɜ ɥ ɐ ɒ ɤ ɵ ə :
ʻ ‿ = ‾ ? ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɪ ɟ ʁ ʌ ɱ ɲ ŋ ɔ ? ˤ ɾ ʃ θ ʊ
ʋ ɯ χ ʏ ʒ ['] ˞ ʳ ʻ 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 ‖ ⫽ ‡ ˆ ⸳ ⸗ ⸜ ⸝ ⸍ ⸌ ⸌ ⸝ ⸜ ⸍ - ˻ ⸜ ⸝ ⸍ ⸌ ⫽ ‖
↓ ↑ ↗ ↘ ´ ˇ ˝ ˜ ' " ˘ ˝ ɓ ɗ ɖ ɢ ɛ ɢ g ʅ ʅ ʄ ʞ + ʎ ⅄ ʒ ɳ
æ ω Ω ʃ ʈ ʈ ʦ ʮ ʯ ʒ ɛ ʒ ʕ ʔ ? ˤ ˂ ˃ l ʌ ɕ ʆ ʤ ʁ ɵ ɞ ɞ ɝ ɤ ɕ
ɦ ʜ ɪ ʄ ʞ ʟ ʐ ɵ ɸ ɗ ɾ ʆ ꜰ œ ɜ ʧ ʊ ʃ ? ꜰ ʐ ᴘ ʙ ɓ ɗ ɗ ɟ
ɢ æ ç ħ ɟ ʃ ⱦ ⱡ ɰ ɰ ɴ ɳ Ɵ ⱦ ɺ ɺ ʀ œ ø ʂ ʈ ʍ ʑ ⱬ þ ⱨ

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ˌ ˌ ˌ ˌ ˌ ˌ ᵇ ← – ↓ ↑ ą ɑ̨ æ̨ 4̨ ɕ ʗ ʖ ɕ̨ ꭣ d̨ d̨ ʥ ȩ ɛ̨ ɣ γ̨ ɣ̨ ꞕ ꞕ̨ ɪ̨
ɟ̨ ʄ̨ ɱ̨ ɰ̨ ꞁ̨ ꞃ̨ ɵ̨ ø̨ ⊙ ꞅ̨ ꞷ ꟕ̨ ꞙ ꟈ̨ ɬ̨ ꞇ̨ z̨ ʓ̨ ɜ̨ ꞎ ꞁ ꞁ ǂ ꞵ ꞵ ꞵ
ꞷ̨ ∀ ꞛ ꭥ Δ Ʞ ꞣ ꞝ Ɦ ꞵ̨ ꞟ ꞯ ꞩ ꞵ

ðə ˈnɔˑθ ˈwɪnd ənd ðə ˈsʌn wə dɪsˈpjuˑtɪŋ wɪtʃ wəz
ðə ˈstrɒŋgɚ, wɛn ə ˈtrævlɚ keɪm əˈlɒŋ ˈræpt ɪn ə
ˈwɔːm ˈkloʊk. ðeɪ əˈgriːd ðət ðə ˈwʌn huˑ fɝˑst
səkˈsiˑdɪd ɪn ˈmeɪkɪŋ ðə ˈtrævlɚ teɪk hɪz ˈkloʊk ɒf ʃʊd
bɪ kənˈsɪdəd ˈstrɒŋgə ðən ði ˈʌðə.

D.17 tipass8 and tipxss8

ˋ ´ ˆ ˜ ¨ ˝ ˳ ˬ ˙ ˝ ᵕ - ˌ ˌ ᵇ ˮ ˋ ˊ ˆ ˷ ᵤ ᵤ ᵤ ˌ ˷ ᵡ ˭ ᵡ ᵎ ꞁ ꞁ ⁺ ᴀ ᴛ ᴀ ˧ ꞁ ꞃ ˊ ! ˒ ꞷ ᵎ ᶜ ˷ ˮ ˈ ( ) * + , - . / ǂ ɨ ʌ ᴣ ᴕ ᴇ ꞵ
ʀ ɵ ə ꞔ ː ᵕ = ᵜ ʔ ə ɑ β ɕ ð ɛ φ ɣ ꞕ ɪ ɟ ʁ ꞁ ꞥ ɲ ꞁ ꞷ ɔ ꞅ ɽ ɾ ʃ θ ʊ υ ɯ χ ɣ ʓ ['] ˮ ꞁ ˋ 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 ꞁ ꞁ ǂ ˓ , ꞁ ᵕ ᵇ ᵇ ᵕ ᵇ ᵇ / / ꞁ ᵇ ᵇ ᵇ ᵇ ᵇ / / / ꞁ ꞁ ↓ ↑ ꞝ ꞝ ꞝ ꞝ ˊ ˋ ˆ ˜ ˙ ' ˮ ˝ ˝ ꞵ ꭣ d̨ ɖ
ᴇ ɡ ꞁ ꞁ ꞁ ꞁ ꞁ λ ꞁ ꞝ ꞝ æ̨ ꞷ ꞝ ꞁ ʈ ʈ ꞇ ꞇ ʦ ꞙ ꞙ ʓ ɜ ꞁ ꞁ ˀ ˋ ˮ ꞁ ᴀ ɕ ꞁ ꞁ ʥ æ ɵ ɵ ꞵ ɣ ꞕ ꞕ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ø ꞵ ꞝ ꞁ ɾ ꟼ ꞇ æ̨
ᵎ ʧ ꞙ ꞵ ꞵ ? ꞅ ꞇ z ꞵ ꞵ ꞵ ꞝ d̨ ꟈ ꞵ ꞷ æ ç ꞕ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ⊙ ꞅ ꞁ ꞁ ꞁ ꞃ œ ø ꞅ ꞇ ꞵ z z ꞝ ꞵ ꞷ

ˌ ˌ ˌ ᵇ ← – ↓ ↑ ą ɑ̨ æ̨ 4̨ ꞵ̨ ꞵ̨ ꞵ̨ ꞵ̨ ꭣ d̨ d̨ ʥ ȩ ɛ̨ ɣ γ̨ ɣ̨ ꞕ ꞕ̨ ɪ̨ ɟ̨ ʄ̨ ɱ̨ ɰ̨ ꞁ̨ ꞃ̨ ɵ̨ ø̨ ⊙ ꞅ̨ ꞷ ꟕ̨ ꞙ ꟈ̨ ɬ̨ ꞇ̨ z̨ ʓ̨ ɜ̨ ꞎ ꞁ ꞁ ǂ
ꞵ ꞵ ꞵ ∀ ꞛ ꭥ Δ Ʞ ꞣ ꞝ Ɦ ꞵ̨ ꞟ ꞯ ꞩ ꞵ

la biːz e l sɔlɛːj sə dispytɛ, ʃakœ̃ asyrã k il etɛ l ply fɔːr, kɑ̃t iz ỹ vy œ̃ vwajaʒœːr ki s avɑ̃sɛ,
ɑ̃vlɔpe dɑ̃ sɔ̃ mɑ̃to. i sɔ̃ tɔ̃be dakɔːr, kə səlyi ki arive l prəmje a fɛr ote sɔ̃ mɑ̃to o vwajaʒœːr, sərɛ
rgarde kɔm l ply fɔːr.

D.18 tipass9 and tipxss9

ˋ ´ ˆ ˜ ¨ ˝ ˳ ˬ ˙ ˝ ᵕ - ˌ ˌ ᵇ ˮ ˋ ˊ ˆ ˷ ᵤ ᵤ ᵤ ˌ ˷ ᵡ ˭ ᵡ ᵎ ꞁ ꞁ ⁺ ᴀ ᴛ ᴀ ˧ ꞁ ꞃ ˊ ! ˒ ꞷ ᵎ ᶜ ˷ ˮ ˈ ( ) * + , - . / ǂ ɨ ʌ
ᴣ ᴕ ꞝ ꞝ ɽ ɵ ə ꞔ ː ᵕ = ᵜ ʔ ə ɑ β ɕ ð ɛ φ ɣ ꞕ ɪ ɟ ʁ ꞁ ꞥ ɲ ꞁ ꞷ ɔ ꞅ ɽ ɾ ʃ θ ʊ υ ɯ χ ɣ ʓ ['] ˮ ꞁ ˋ 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 ꞁ ꞁ ǂ ˓ , ꞁ ᵕ ᵇ ᵇ ᵕ ᵇ ᵇ / / ꞁ ᵇ ᵇ ᵇ ᵇ ᵇ / / / ꞁ ꞁ ↓ ↑ ꞝ ꞝ
ˊ ˋ ˆ ˜ ˙ ' ˮ ˝ ˝ ꞵ ꭣ d̨ ɖ ᴇ ɡ ꞁ ꞁ ꞁ ꞁ ꞁ λ ꞁ ꞝ ꞝ æ̨ ꞷ ꞝ ꞁ ʈ ʈ ꞇ ꞇ ʦ ꞙ ꞙ ʓ ɜ ꞁ ꞁ ˀ ˋ ˮ ꞁ ᴀ ɕ ꞁ ꞁ ʥ æ ɵ ɵ
ɜ ɣ ꞕ ꞕ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ø ꞵ ꞝ ꞁ ɾ ꟼ ꞇ æ̨ ᵎ ʧ ꞙ ꞵ ꞵ ? ꞅ ꞇ z ꞵ ꞵ ꞵ ꞝ d̨ ꟈ ꞵ ꞷ æ ç ꞕ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ꞁ ⊙ ꞅ ꞁ ꞁ ꞁ ꞃ
œ ø ꞅ ꞇ ꞵ z z ꞝ ꞵ ꞷ

ˌ ˌ ˌ ˌ ᵇ ← – ↓ ↑ ą ɑ̨ æ̨ 4̨ ꞵ̨ ꞵ̨ ꞵ̨ ꞵ̨ ꭣ d̨ d̨ ʥ ȩ ɛ̨ ɣ γ̨ ɣ̨ ꞕ ꞕ̨ ɪ̨ ɟ̨ ʄ̨ ɱ̨ ɰ̨ ꞁ̨ ꞃ̨ ɵ̨ ø̨ ⊙ ꞅ̨ ꞷ ꟕ̨ ꞙ ꟈ̨ ɬ̨ ꞇ̨ z̨ ʓ̨ ɜ̨
ꞎ ꞁ ꞁ ǂ ꞵ ꞵ ꞵ ∀ ꞛ ꭥ Δ Ʞ ꞣ ꞝ Ɦ ꞵ̨ ꞟ ꞯ ꞩ ꞵ

ˈʔaɪnst ʃtrɪtən zɪç ˈnɔʁtvɪnt ʔʊnt ˈzɔnə, ˈveːʁ fɔn ʔiˑnən ˈbaɪdən voːl deʁ ˈʃtɛʁkeʁə vɛːʁə,
ʔals ʔaɪn ˈvandeʁeʁ, deːʁ ʔɪn ʔaɪnən vaʁmən ˈmantəl gəˈhʏlt vaːʁ, dəs veːgəs daˑˈheːʁ
kaːm. ziˑ vʊʁdən ˈʔaɪnɪç, das ˈdeːʁjeːnɪgə fyːʁ dən ˈʃtɛʁkeʁən gɛltən zɔltə, deːʁ dən
ˈvandeʁeʁ ˈtsvɪŋən vyʁdə, zaɪnən ˈmantəl ˈʔaptsuˑneːmən.

D.19 `tipab10` and `tipxb10`

marra ∫ ∫amsi wi r ri:ħ ka:nu bi jitxanʔum ʔinhu l ʔaʔwa fi:hum. u baʕde:n ∫a:fu ra:gil sa:jiħ gaj mim baʕi:d mitlaffaʕ bi ʕaba:ja tʔi:la. fa ttafaʔum ʕala ʔin illi jixalli:h jiʔlaʕ il ʕaba:ja fi l ʔawwal jiku:n huwwa ʔaʔwa mit ta:ni.

D.20 `tipabs10` and `tipxbs10`

upepo ulikuwa ukiɓi∫ana na ɟua kuwa nani mweŋe ŋguvu kupita mwenziwe, mara akapita masafiri alijekuwa amevaa ɟuɓa. walipatana kuwa atakajemvua ɟuɓa kwanza msafiri ndije mweŋe ŋguvu.

D.21 `tipasb10` and `tipxsb10`

ðə 'nɔ·θ 'wɪnd ənd ðə 'sʌn wə dɪs'pjuˑtɪŋ witʃ wəz ðə 'strɒŋgə, wɛn ə 'trævlɛ keɪm ə'lɒŋ 'ræpt ɪn ə 'wɔːm 'kloʊk. ðeɪ ə'griːd ðət ðə 'wʌn huˑ fɜˑst sək'siˑdɪd ɪn 'meɪkɪŋ ðə 'trævle teɪk hɪz 'kloʊk ɒf ʃʊd bɪ kən'sɪdəd 'strɒŋgə ðən ði 'ʌðə.

D.22 `tipasi10` and `tipxsi10`

```
` ´ ^ ~ ¨ ˝ ˚ ˘ ˇ ˉ · ˌ ˍ " ˋ ˊ ˙  ˏ ˎ ˟  ˏ ˙ ˜  ˟ ˱ ˲ + ˉ ᵀ ˞ ˌ ′ ! ′ ˤ ˷ ˜ ′ ( ) * + , - .
/ ʉ ɨ ʌ ɜ ɥ ɐ ɒ ɤ ɵ ə : · ⌣ = ⌢ ʔ ʕ ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɟ ɰ ʁ ʌ ɱ ŋ ɲ ɔ ʡ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʎ
ʒ [ ' ] ˥ ˩ ˈ 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 ‖ | ‡ ˛ , ˎ ˏ ˋ ˌ ˍ ˎ ˏ ˌ
ˍ ˎ ˏ ˌ / | ‖ ↓ ↑ ↗ ↘ ˘ ˇ ˜ ˜ ˙ " ˝ �b ɓ ɗ ʄ ɠ ɛ ɢ ɺ ɻ ʏ ɤ ɬ ʎ ʎ ɦ ɳ æ ω ɷ ʅ ʧ ʦ ʨ ʦ ʮ ʯ
ʒ ɛ ʒ ʙ ʔ ˂ ˃ ɭ ʌ ɕ ʆ ʥ ʥ ɞ ʘ ʚ ɜ ʒ ʎ ɕ ɧ ʜ ʮ ʄ ʞ ʆ ʎ ɞ ʘ ɕ ɼ ʄ ʄ œ ʉ ʊ ʔ ʂ ʆ ʐ ʙ ɓ ʓ ɗ
ɠ ɢ æ ç ħ ʄ ʄ ʄ ɬ ɰ ŋ ɴ ɲ ʘ ɾ ɺ ɹ ʀ œ ø ʂ ʈ ɯ ʐ ʑ þ ʍ
```

```
ˌ ˌ ˌ ˌ ˌ ˚ ˤ - ↓ ↑ ɑ ɑ ɒ ɐ ʄ ɕ ɭ ɕ ɕ ɗ ɗ ɖ ɸ ɛ ɜ ɣ ɣ ɣ ɦ ɧ ɹ ɨ ʄ ʃ ɦ ɱ ŋ ɳ ʚ ♀
ʘ ɷ ɖ ʊ ʑ Ⓞ ʂ ɔ ɯ ɸ ɸ ɭ ʈ ɧ ʒ ʒ ɛ ʒ ɜ ʄ | ʅ ‖ ‡ þ ɸ ɖ ɖ ʄ ɑ ɑ ɑ Δ ʄ ʞ ɭ ɹ ʌ ʍ ʀ ʁ ɒ ɐ ʉ
```

la biːz e l sɔlɛːj sə dispytɛ, ʃakœ̃ asyrɑ̃ k il etɛ l ply fɔːr, kɑ̃t iz õ vy œ̃ vwajaʒœːr ki s avɑ̃sɛ, ãvlɔpe dɑ̃ sõ mãto. i sõ tõbe dakɔːr, kə səlyi ki arivɛ l prəmje a fɛr ote sõ mãto o vwajaʒœːr, sərɛ rgarde kɔm l ply fɔːr.

D.23 `tipatt10` and `tipxtt10`

```
` ´ ^ ~ ¨ ˝ ˚ ˘ ˇ ˉ · ˌ ˍ " ˋ ˊ ˙  ˏ ˎ ˟  ˏ ˙ ˜  ˉ ɭ ʄ + ˉ ᵀ ˞ ˌ ´ !
′ ˤ ˌ ˌ ˜ ′ ( ) * + , - . / ʉ ɨ ʌ ɜ ɥ ɐ ɒ ɤ ɵ ə : · ⌣ = ⌢ ʔ ə ɑ β ɕ
ð ɛ ɸ ɣ ɦ ɟ ɰ ʁ ʌ ɱ ŋ ɲ ɔ ʡ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʎ ʒ [ ' ] ˥ ˩ ˈ 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 ‖ | ‡ ˜ , ˎ ˏ ˋ ˌ ˍ ˎ ˏ ˌ
ˍ ˎ ˏ ˌ / | ‖ ↓ ↑ ↗ ↘ ˘ ˇ ˜ ˜ ˙ " ˝ ˜ ɓ ɗ ʄ ɠ ɛ ɢ ɺ ɻ ʏ ɤ
ɬ ʎ ʎ ɦ ɳ æ ω ɷ ʅ ʧ ʦ ʨ ʦ ʮ ʯ ʒ ɛ ʒ ʙ ʔ ˂ ˃ ɭ ʌ ɕ ʆ ʥ ʥ ɞ ʘ ʚ ɜ ʒ ʎ ɕ ɧ ʜ
ʮ ʄ ʞ ʆ ʎ ɞ ʘ ɕ ɼ ʄ ʄ œ ʉ ʊ ʔ ʂ ʆ ʐ ʙ ɓ ʓ ɗ ɠ ɢ æ ç ħ ʄ ʄ ʄ ɬ
ɰ ŋ ɴ ɲ ʘ ɾ ɺ ɹ ʀ œ ø ʂ ʈ ɯ ʐ ʑ þ ʍ
```

```
ˌ ˌ ˌ ˌ ˌ ˚ ˤ ˞ ↓ ↑ ɑ ɑ ɒ ɐ ʄ ɕ ɭ ɕ ɕ ɗ ɗ ɖ ɸ ɛ ɜ ɣ ɣ ɣ ɦ ɧ ɹ ɨ ʄ ʃ ɦ ɱ ŋ ɳ ʚ ♀
Ⓞ ʂ ɔ ɯ ɸ ɸ ɭ ʈ ɧ ʒ ʒ ɛ ʒ ɜ ʄ | ʅ ‖ ‡ þ ɸ ɖ ɖ ʄ ɑ ɑ ɑ Δ ʄ ʞ ɭ ɹ ʌ ʍ ʀ ʁ ɒ ɐ ʉ
```

```
'ʔaɪnst ʃtʁɪtən zɪç 'nɔʁtvɪnt ʔʊnt 'zɔnə, 've:ʁ fɔn ʔiˑnən
'baɪdən voːl deʁ 'ʃtɛʁkeʁə veːʁə, ʔals ʔaɪn 'vandeʁeʁ, deːʁ ʔɪn
ʔaɪnən vaʁmən 'mantəl gə'hʏlt vaːʁ, dəs veːʁes daˑ'heːʁ kaːm.  ziˑ
vuʁdən 'ʔaɪnɪç, das 'deːʁjeːnɪgə fyːʁ dən 'ʃtɛʁkeʁən gɛltən
zɔltə, deːʁ dən 'vandeʁeʁ 'tsvɪŋən vyʁdə, zaɪnən 'mantəl
'ʔaptsuˑneːmən.
```

D.24 `tipatt12` and `tipxtt12`

```
` ´ ^ ~ ¨ ˝ ˚ ˘ ˇ ˉ · ˌ ˍ " ˋ ˊ ˙  ˏ ˎ ˟  ˏ ˙ ˜  ˉ ɭ ʄ + ˉ
ᵀ ˞ ˌ ´ ! ′ ˤ ˌ ˌ ˜ ′ ( ) * + , - . / ʉ ɨ ʌ ɜ ɥ ɐ ɒ ɤ ɵ ə
: · ⌣ = ⌢ ʔ ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɟ ɰ ʁ ʌ ɱ ŋ ɲ ɔ ʡ ʕ ɾ ʃ θ ʊ ʋ
ɯ χ ʎ ʒ [ ' ] ˥ ˩ ˈ 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 ‖ | ‡ ˜ , ˎ ˏ ˋ ˌ ˍ ˎ ˏ ˌ ˍ ˎ ˏ ˌ / | ‖ ↓ ↑ ↗ ↘ ˘ ˇ ˜ ˜ ˙ " ˝ ˜ ɓ ɗ ʄ ɠ ɛ ɢ ɺ ɻ ʏ ɤ ɬ ʎ ʎ ɦ
ɳ æ ω ɷ ʅ ʧ ʦ ʨ ʦ ʮ ʯ ʒ ɛ ʒ ʙ ʔ ˂ ˃ ɭ ʌ ɕ ʆ ʥ ʥ ɞ ʘ ʚ ɜ ʒ ʎ ɕ ɧ ʜ
ʮ ʄ ʞ ʆ ʎ ɞ ʘ ɕ ɼ ʄ ʄ œ ʉ ʊ ʔ ʂ ʆ ʐ ʙ ɓ ʓ ɗ ɠ ɢ æ ç
ħ ʄ ʄ ʄ ɬ ɰ ŋ ɴ ɲ ʘ ɾ ɺ ɹ ʀ œ ø ʂ ʈ ɯ ʐ ʑ þ ʍ
```

marra ʃ ʃamsi wi r riːħ kaːnu bi jitxanʔum ʔinhu l ʔaʔwa
fiːhum. u baʕdeːn ʃaːfu raːgil saːjiħ gaj mim baʕiːd
mitlaffaʕ bi ʕabaːja tʔiːla. fa ttafaʔum ʕala ʔin illi
jixalliːh jiʔalʕ il ʕabaːja fi l ʔawwal jikuːn huwwa
ʔaʔwa mit taːni.

D.25   tipatt8 and tipxtt8

upepo ulikuwa ukiɓiʃana na ɟua kuwa nani mweŋe ŋguvu kupita mwenziwe, mara
akapita masafiri alijekuwa amevaa ɟuɓa. walipatana kuwa atakajemvua ɟuɓa kwanza
msafiri ndije mweŋe ŋguvu.

D.26   tipatt9 and tipxtt9

ðə ˈnɔˑθ ˈwɪnd ənd ðə ˈsʌn wə dɪsˈpjuˑtɪŋ wɪtʃ wəz ðə ˈstrɒŋgə, wɛn ə
ˈtrævlə keɪm əˈlɒŋ ˈræpt ɪn ə ˈwɔːm ˈkloʊk. ðeɪ əˈgriˑd ðət ðə ˈwʌn huˑ
fɜˑst səkˈsiˑdɪd ɪn ˈmeɪkɪŋ ðə ˈtrævlə teɪk hɪz ˈkloʊk ɒf ʃʊd bɪ
kənˈsɪdəd ˈstrɒŋgə ðən ðɪ ˈʌðə.

D.27   tipats10 and tipxts10

／ ＿ ＼ ＼ ＼ ＼ ⌣ ⌢ ／ ／ | ‖ ↓ ↑ ↗ ↘ ´ ` ˜ ˜ ' " ˝ ˘ ƀ đ ɖ ɖ ʚ ɢ ƍ ƍ ɟ x
ɫ ʎ ʎ ɦ ɳ ₥ ω ʊ ʃ ʧ ʦ ʦ ʨ ʮ ʯ ʒ ʓ ʙ ɓ ˀ ˁ ˂ ˃ ˥ ʌ ɕ ʆ ɠ ʚ ɘ ɞ ɝ ɣ ɕ ɦ н
ɿ ɿ ɤ ʟ ʅ ɵ ɞ ɋ ɹ ɪ ʦ œ ɹ ʧ ʊ ʔ ʕ ʗ ʐ ʁ ʙ ɓ ɗ ɖ ɠ ɞ æ ç ħ ʄ ʄ ɬ ɬ ɭ
ɰ ɳ ɴ ɲ θ ɽ ɿ ɿ ʀ œ ø ʂ ʈ ʍ ʑ ʐ ʐ þ ʋ

˒ ˛ ˬ ˭ ˚ ˕ ˖ ˗ ˔ ˮ ˖ ˋ ˆ ᷇ ᷆ ᷉ ᷈ ᷄ ᷅ ˥ ᷊ ˈ ᷋ ᷌ ̃ ᷉ ᷈ ɑ̨ ɑ æ ᷿ ʗ ʗ ʗ ʠ ʠ ɸ ɛ̣ ɛ̨ ɛ̣ γ γ ɣ ɦ̣ ɦ̣ ɿ ɟ̣ ʃ̣ ɦ̥ ɳ ɳ ŋ ᷒ ᷓ ⊙ ᷑ ᷐ ᷏ ᷎ ʄ̣ ᷔ ᷕ ᷖ ᷗ ɀ ʑ ᷘ ᷙ ᷚ ᷛ ᷜ ᷝ | ǀ ǁ ǂ þ þ þ þ ʋ ʌ ᴧ ⅄ ꟻ ꓘ ꓘ ⅃ ꓭ ꓷ ꓷ ꓨ ꓵ ꓠ

*la biːz e l sɔlɛːj sə dispytɛ, ʃakœ̃ asyrɑ̃ k il etɛ l ply fɔːr,
kɑ̃t iz õ vy œ̃ vwajaʒœːr ki s avɑ̃sɛ, ɑ̃vlɔpe dɑ̃ sõ mɑ̃to. i sõ tõbe
dakɔːr, kə səlyi ki arivɛ l prəmje a fɛr ote sõ mɑ̃to o vwajaʒœːr,
sərɛ rgarde kɔm l ply fɔːr.*

D.28   `xipa10` and `xipx10`

` ´ ^ ˜ ˝ ˮ ˘ ˚ ˠ ˘ ˗ ˌ � ˒ ˡ ᷇ ᷆ ᷉ ᷈ ᷄ ᷅ ˟ ᷋ 1 Ɉ ↓ ↑ ↗ ↘ ´ ! ' ᷋ ˜ ' ( ) * + , - . / ʉ ɨ ᴧ ʌ ᴣ ɥ ɐ ʁ ɑ
ʏ ɵ ɵ ː ⌣ = ⌢ ? ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɿ ɟ ʁ ⅄ ɱ ɲ ɔ ʃ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ [ˈ] ᷋ ᷋ ᷋ 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 ‖ | ǂ ˆ ˌ ̣ ＼ ＼ ＼ ／ ／ / ̣ ＼ ＼ ／ / / | ‖ ↓ ↑ ↗ ↘ ´ ` ˜ ˜ ' " ˝ ˘ ƀ
đ ɖ ɖ ʚ ɢ ƍ ƍ ɟ x ɫ ʎ ʎ ɦ ɳ ₥ ω ʊ ʃ ʧ ʦ ʦ ʨ ʮ ʯ ʒ ʓ ʙ ɓ ˀ ˁ ˂ ˃ ˥ ʌ ɕ ʆ ɠ ʚ ɘ ɞ ɝ ɣ ɕ ɦ ɦ ɿ ɟ ʁ ʟ ʅ ɵ
ɞ ɋ ɹ ʃ ɿ ɘ ɱ ʧ ʊ ʔ ʕ ʗ ʐ ʁ ʙ ɓ ɗ ɖ ɠ ɞ æ ç ħ ʄ ʄ ɬ ɬ ɭ ɰ ɳ ɴ ɲ θ ɽ ɿ ɿ ʀ œ ø ʂ ʈ ʍ ʑ ʐ ʐ þ ʋ

˒ ˛ ˬ ˭ ˚ ˕ ˖ ˗ ˔ ˮ ˖ ˋ ˆ ᷇ ᷆ ᷉ ᷈ ᷄ ᷅ ˥ ᷊ ˈ ᷋ ᷌ ̃ ᷉ ᷈ ɑ̨ ɑ æ ᷿ ʗ ʗ ʗ ʠ ʠ ɸ ɛ̣ ɛ̨ ɛ̣ γ γ ɣ ɦ̣ ɦ̣ ɿ ɟ̣ ʃ̣ ɦ̥ ɳ ɳ ŋ ᷒ ᷓ ⊙ ᷑ ᷐ ᷏ ᷎ ʄ̣ ᷔ ᷕ ᷖ ᷗ ɀ ʑ ᷘ ᷙ ᷚ ᷛ ᷜ ᷝ
ᷔ ᷕ | ǀ ǁ ǂ þ þ þ þ ʋ ʌ ᴧ ⅄ ꟻ ꓘ ꓘ ⅃ ꓭ ꓷ ꓷ ꓨ ꓵ ꓠ

ˈʔaɪnst ʃtrɪtən zɪç ˈnɔʁtvɪnt ʔʊnt ˈzɔnə, ˈveːʁ fɔn ʔiˈnən ˈbaɪdən voːl dɐʁ ˈʃtɛʁkəʁə
veːʁə, ʔals ʔaɪn ˈvandəʁəʁ, deːʁ ʔɪn ʔaɪnən vaʁmən ˈmantəl gəˈhʏlt vaːʁ, dəs veːɡəs
daːˈheːʁ kaːm. ziˑ vʊʁdən ˈʔaɪnɪç, das ˈdeːʁjeːnɪɡə fyːʁ dən ˈʃtɛʁkəʁən ɡɛltən zɔltə,
deːʁ dən ˈvandəʁəʁ ˈtsvɪŋən vyʁdə, zaɪnən ˈmantəl ˈʔaptsuˑneːmən.

D.29   `xipab10` and `xipxb10`

**` ´ ^ ˜ ˝ ˮ ˘ ˚ ˠ ˘ ˗ ˌ ˒ ˡ ᷇ ᷆ ᷉ ᷈ ᷄ ᷅ ˟ ᷋ 1 Ɉ ↓ ↑ ↗ ↘ ´ ! ' ᷋ ˜ ' ( ) * + , - . / ʉ ɨ
ᴧ ʌ ᴣ ɥ ɐ ʁ ɑ ʏ ɵ ɵ ː ⌣ = ⌢ ? ə ɑ β ɕ ð ɛ ɸ ɣ ɦ ɿ ɟ ʁ ⅄ ɱ ɲ ɔ ʃ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ [ˈ]
᷋ ᷋ ᷋ 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 ‖ | ǂ ˆ ˌ ̣ ＼ ＼ ＼ ／ ／ / ̣ ＼ ＼ ／ /
| ‖ ↓ ↑ ↗ ↘ ´ ` ˜ ˜ ' " ˝ ˘ ƀ đ ɖ ɖ ʚ ɢ ƍ ƍ ɟ x ɫ ʎ ʎ ɦ ɳ ₥ ω ʊ ʃ ʧ ʦ ʦ ʨ ʮ ʯ ʒ ʓ ʙ ɓ ˀ ˁ ˂ ˃
˥ ʌ ɕ ʆ ɠ ʚ ɘ ɞ ɝ ɣ ɕ ɦ ɦ ɿ ɟ ʁ ʟ ʅ ɵ ɞ ɋ ɹ ʃ ɿ ɘ ɱ ʧ ʊ ʔ ʕ ʗ ʐ ʁ ʙ ɓ ɗ ɖ ɠ ɞ æ ç ħ ʄ ʄ
ɬ ɬ ɭ ɰ ɳ ɴ ɲ θ ɽ ɿ ɿ ʀ œ ø ʂ ʈ ʍ ʑ ʐ ʐ þ ʋ**

**˒ ˛ ˬ ˭ ˚ ˕ ˖ ˗ ˔ ˮ ˖ ˋ ˆ ᷇ ᷆ ᷉ ᷈ ᷄ ᷅ ˥ ᷊ ˈ ᷋ ᷌ ̃ ᷉ ᷈ ɑ̨ ɑ æ ᷿ ʗ ʗ ʗ ʠ ʠ ɸ ɛ̣ ɛ̨ ɛ̣ γ γ ɣ ɦ̣ ɦ̣ ɿ ɟ̣ ʃ̣ ɦ̥ ɳ ɳ ŋ ᷒ ᷓ ⊙ ᷑ ᷐ ᷏ ᷎ ʄ̣ ᷔ
ᷕ ɀ ʑ ᷘ ᷙ ᷚ ᷛ ᷜ ᷝ ᷔ ᷕ | ǀ ǁ ǂ þ þ þ þ ʋ ʌ ᴧ ⅄ ꟻ ꓘ ꓘ ⅃ ꓭ ꓷ ꓷ ꓨ ꓵ ꓠ**

**marra ʃ ʃamsi wi r riːħ kaːnu bi jitxanʔum ʔinhu l ʔaʔwa fiːhum. u baʕdeːn
ʃaːfu raːgil saːjiħ gaj mim baʕiːd mitlaffaʕ bi ʕabaːja tʔiːla. fa ttafaʔum ʕala
ʔin illi jixalliːh jiʔlaʕ il ʕabaːja fi l ʔawwal jikuːn huwwa ʔaʔwa mit taːni.**

D.30 xipasl10 and xipxsl10

ˋ ˊ ˜ ¨ ˝ ° ˘ ˇ - . ̣ ̇ " ̀ ́ ̑ ̯ ̮ ̝ ̞ ̩ ̃ ̚ ˣ ɩ ɟ + ⊥ ⊤ ⊦ ´ ! ˈ ˌ ˜ ' ( ) * + , - . / ʉ ɨ ʌ ɜ ɥ ɐ ɒ
ɤ θ ə : ‿ = ⁀ ? ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ ȷ ʁ ʎ ɱ ŋ ɔ ʔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ [´] ˮ ˮ ' 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 ‖ | ‡ ˆ ˏ ˎ ˌ ˍ ˊ ˍ ˍ ˊ ˍ ˍ | ‖ ↓ ↑ ↗ ↘ ´ ` ˆ ˜ ' " ˝ ˘ ƀ
ɖ ɗ ɖ ʄ ʒ ɡ ɠ ɠ ɟ ʝ ɣ ɬ λ ƛ ɮ ɳ œ ω ɷ ʃ ʈ ʦ ʨ ʧ ɥ ʢ ʒ ʑ ʙ ь ˀ ˂˃ | ʌ ɕ ʗ ʤ ʒ ɞ ɵ ɜ ɤ ɣ ɢ ɦ ʜ ɪ ɟ ʞ ʟ ʎ ɓ ɷ
ɓ ɗ ʄ ɭ ʈ œ ɟ ʧ ʊ ʃ ʔ ʕ ʒ ʐ ʀ ʙ ɓ ɗ ɖ ʄ ɢ æ ç ħ ʄ ʄ ʈ ɬ ɰ ɰ ŋ ɴ ɲ ʘ ʈ ɹ ɻ ɾ œ ø ʂ ʈ ʍ ʐ ʑ ʐ þ ʋ

ˌ ˌ ˌ ˌ ˮ ˾ ˮ ↓ ↑ ą ɑ æ ɤ ɕ ʗ ɕ ɟ ɗ ɗ ʥ ɛ ɛ ɣ ɣ ɣ ɦ ɦ ɟ ɟ ʃ ɰ ɳ ɳ ʢ ʢ ⊙ ʡ ɷ ɸ ɸ ɫ ʈ
ʒ ʑ ʒ ɛ ʐ ʑ / ‖ ‡ þ þ þ þ ʌ ɐ ɐ ∆ ꜰ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ

*upepo ulikuwa ukiɓiʃana na ʝua kuwa nani mweŋe ŋguvu kupita mwenziwe, mara
akapita masafiri alijekuwa amevaa ʝuɓa. walipatana kuwa atakajemvua ʝuɓa kwanza
msafiri ndije mweŋe ŋguvu.*

D.31 xipass10 and xipxss10

ˋ ˊ ˜ ¨ ˝ ° ˘ ˇ - . ̣ ̇ " ̀ ́ ̑ ̯ ̮ ̝ ̞ ̩ ̃ ̚ ˣ ɩ ɟ + ⊥ ⊤ ⊦ ´ ! ˈ ˌ ˜ ' ( ) * + , - . / ʉ ɨ
ʌ ɜ ɥ ɐ ɒ ɤ θ ə : ‿ = ⁀ ? ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ ȷ ʁ ʎ ɱ ŋ ɔ ʔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ [´] ˮ ˮ
' 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 ‖ | ‡ ˆ ˏ ˎ ˌ ˍ ˊ ˍ ˍ ˊ ˍ ˍ | ‖ ↓
↑ ↗ ↘ ´ ` ˆ ˜ ' " ˝ ˘ ƀ ɖ ɗ ʄ ʒ ɡ ɠ ɠ ɟ ʝ ɣ ɬ λ ƛ ɮ ɳ œ ω ɷ ʃ ʈ ʦ ʨ ʧ ɥ ʢ ʒ ʑ ʙ ь ˀ ˂˃ | ʌ ɕ
ʗ ʤ ʒ ɞ ɵ ɜ ɤ ɣ ɢ ɦ ʜ ɪ ɟ ʞ ʟ ʎ ɓ ɷ ɓ ɗ ʄ ɭ ʈ œ ɟ ʧ ʊ ʃ ʔ ʕ ʒ ʐ ʀ ʙ ɓ ɗ ɖ ʄ ɢ æ ç ħ ʄ ʄ ʈ ɬ ɰ
ɰ ŋ ɴ ɲ ʘ ʈ ɹ ɻ ɾ œ ø ʂ ʈ ʍ ʐ ʑ ʐ þ ʋ

ˌ ˌ ˌ ˌ ˮ ˾ ˮ - ↓ ↑ ą ɑ æ ɤ ɕ ʗ ɕ ɟ ɗ ɗ ʥ ɛ ɛ ɣ ɣ ɣ ɦ ɦ ɟ ɟ ʃ ɰ ɳ ɳ ʢ ʢ ⊙ ʡ ɷ ɸ ɸ ɫ ʈ
ʒ ʑ ʒ ɛ ʐ ʑ / ‖ ‡ þ þ þ þ ʌ ɐ ɐ ∆ ꜰ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ

ðə ˈnɔːθ ˈwɪnd ənd ðə ˈsʌn wə dɪsˈpjuːtɪŋ wɪtʃ wəz ðə ˈstrɒŋgə, wɛn ə ˈtrævlə keɪm
əˈlɒŋ ˈræpt ɪn ə ˈwɔːm ˈkloʊk. ðeɪ əˈgriːd ðət ðə ˈwʌn huː fɜːst səkˈsiːdɪd ɪn ˈmeɪkɪŋ
ðə ˈtrævlə teɪk hɪz ˈkloʊk ɒf ʃʊd bɪ kənˈsɪdəd ˈstrɒŋgə ðən ðɪ ˈʌðə.

D.32 xipabs10 and xipxbs10

ˋ ˊ ˆ ˜ ¨ ˝ ° ˘ ˇ - . ̣ ̇ " ̀ ́ ̑ ̯ ̮ ̝ ̞ ̩ ̃ ̚ ˣ ɩ ɟ + ⊥ ⊤ ⊦ ´ ! ˈ ˌ ˜ ' ( ) * + , - . / ʉ ɨ
ʌ ɜ ɥ ɐ ɒ ɤ θ ə : ‿ = ⁀ ? ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ ȷ ʁ ʎ ɱ ŋ ɔ ʔ ʕ ɾ ʃ θ ʊ ʋ ɯ χ ʏ ʒ [ˈ]
ˮ ˮ ' 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 ‖ | ‡ ˆ ˏ ˎ ˌ ˍ ˊ ˍ ˍ ˊ ˍ ˍ
| ‖ ↓ ↑ ↗ ↘ ´ ` ˆ ˜ ' " ˝ ˘ ƀ ɖ ɗ ʄ ʒ ɡ ɠ ɠ ɟ ʝ ɣ ɬ λ ƛ ɮ ɳ œ ω ɷ ʃ ʈ ʦ ʨ ʧ ɥ ʢ ʒ ʑ ʙ ь ˀ ˂˃
| ʌ ɕ ʗ ʤ ʒ ɞ ɵ ɜ ɤ ɣ ɢ ɦ ʜ ɪ ɟ ʞ ʟ ʎ ɓ ɷ ɓ ɗ ʄ ɭ ʈ œ ɟ ʧ ʊ ʃ ʔ ʕ ʒ ʐ ʀ ʙ ɓ ɗ ɖ ʄ ɢ æ ç ħ ʄ ʄ
ʈ ɬ ɰ ɰ ŋ ɴ ɲ ʘ ʈ ɹ ɻ ɾ œ ø ʂ ʈ ʍ ʐ ʑ ʐ þ ʋ

ˌ ˌ ˌ ˌ ˮ ˾ ˮ - ↓ ↑ ą ɑ æ ɤ ɕ ʗ ɕ ɟ ɗ ɗ ʥ ɛ ɛ ɣ ɣ ɣ ɦ ɦ ɟ ɟ ʃ ɰ ɳ ɳ ʢ ʢ ⊙ ʡ ɷ ɸ ɸ ɫ ʈ
ʒ ʑ ʒ ɛ ʐ ʑ / ‖ ‡ þ þ þ þ ʌ ɐ ɐ ∆ ꜰ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ ꜱ

**la biːz e l sɔlɛːj sə dispytɛ, ʃakœ̃ asyrɑ̃ k il etɛ l ply fɔːr, kɑ̃t iz ɔ̃ vy œ̃
vwajaʒœːr ki s avɑ̃sɛ, ɑ̃vlɔpe dɑ̃ sɔ̃ mɑ̃to. i sɔ̃ tɔ̃be dakɔːr, kə səlyi ki arivɛ l
prəmje a fɛr ote sɔ̃ mɑ̃to o vwajaʒœːr, sɛrɛ rgarde kɔm l ply fɔːr.**

D.33 `xipasi10` and `xipxsi10`

`´ ´ ^ ~ ¨ ˝ ˳ �’ �“ ˴ ˵ ˶ ˷ ˏ ˌ ‘ ’ ˜ ’ ( ) * + , - . / ʉ ɨ`
`ʌ з ɥ ɐ ɒ ɤ θ ə ː ‿ = ⁀ ʔ ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ j ʁ ʌ ɱ ŋ ɔ ʔ ʕ r ʃ θ ʋ ʊ ɯ χ ʏ ʒ [ ’ ] ˈ ˌ`
`‘ 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 ‖ | ‡ ˇ ˏ ˌ ˎ ˏ ˍ ˊ ˋ`

'ʔaɪnst ʃtrɪtən zɪç 'nɔʁtvɪnt ʔʊnt 'zɔnə, 've:ʁ fɔn ʔi·nən 'baɪdən vo:l deʁ 'ʃtɛʁkeʁə
ve:ʁə, ʔals ʔaɪn 'vandeʁeʁ, de:ʁ ʔɪn ʔaɪnən vaʁmən 'mantəl gə'hʏlt va:ʁ, dəs
ve:gəs da:'he:ʁ ka:m. ziˑ vʊʁdən 'ʔaɪnɪç, das 'de:ʁje:nɪgə fy:ʁ dən 'ʃtɛʁkeʁən
gɛltən zɔltə, de:ʁ dən 'vandeʁeʁ 'tsvɪŋən vyʁdə, zaɪnən 'mantəl 'ʔaptsu·ne:mən.

D.34 `xipasb10` and `xipxsb10`

`´ ´ ^ ~ ¨ ˝ ˳ ˶ ˷ ˏ ˌ ˈ ˌ`
`. / ʉ ɨ ʌ з ɥ ɐ ɒ ɤ θ ə ː ‿ = ⁀ ʔ ə a β ɕ ð ɛ ɸ ɣ ɦ ɪ j ʁ ʌ ɱ ŋ ɔ ʔ ʕ r ʃ θ ʋ ʊ`
`ɯ χ ʏ ʒ [ ’ ] ˈ ˌ ‘ 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 ‖ | ‡`

marra ʃ ʃamsi wi r riːħ kaːnu bi jitxanˀum ʔinhu l ʔaʔwa fiːhum. u baʕdeːn
ʃaːfu raːgil saːjiħ gaj mim baʕiːd mitlaffaʕ bi ʕabaːja tˀiːla. fa ttafaʔum
ʕala ʔin illi jixalliːħ jiʔlaʕ il ʕabaːja fi l ʔawwal jikuːn huwwa ʔaʔwa mit
taːni.

E   Layout of **TIPA** fonts

E.1   tipa10

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	^	~	¨	″	°	˘	"0x
´01x	˘	¯	·	˒	˓	‶	ˋ	ˏ	
´02x	ˆ	⌐	⌐	◻	˒	˓	◡	˜	"1x
´03x	˟	ı	J	˖	˔	˕	˧	˨	
´04x	´	!	'	˞	˞	˟	˜	˒	"2x
´05x	(	)	*	+	,	-	·	/	
´06x	ʉ	ɨ	ʌ	ȝ	ɥ	ɐ	ɒ	ɤ	"3x
´07x	ɵ	ə	ː	˙	‿	=	⁀	?	
´10x	ə	ɑ	β	ç	ð	ɛ	ɸ	ɣ	"4x
´11x	ɦ	ɪ	ɟ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʔ	ʕ	ɾ	ʃ	θ	ʊ	ʋ	ɯ	"5x
´13x	χ	ʏ	ʒ	[	˟	]	˥	˩	
´14x	'	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	‖	|	‡	˞	ˌ	
´20x	ˎ	ˋ	ˎ	ˎ	ˎ	ˏ	ˊ	ˊ	"8x
´21x	ˊ	ˍ	ˎ	ˎ	ˎ	ˎ	ˏ	ˊ	
´22x	ˊ	ˊ	|	‖	↓	↑	↗	↘	"9x
´23x	ˬ	˯	˞	˷	'	″	˞	˞	
´24x	ƀ	đ	ɖ	ɗ	ᴇ	g	ɭ	ɺ	"Ax
´25x	ᴊ	ɻ	ł	λ	ƛ	ɓ	ɳ	æ	
´26x	ω	Ω	ʃ	ʈ	ɫ	ts	ɥ	ɥ	"Bx
´27x	ᴣ	ᴣ	ʙ	ʙ	ˀ	˂	˃	|	
´30x	ᴀ	ć	ɕ	ʥ	ɚ	ɞ	ɜ	ɝ	"Cx
´31x	ˠ	ɠ	ɦ	ʜ	ɩ	ɟ	ƙ	ʟ	
´32x	ɮ	ɷ	ɸ	ʠ	ɼ	ɹ	ƭ	œ	"Dx
´33x	�ñ	ʧ	ᴜ	ʌ	ʡ	ʢ	ʐ	ρ	
´34x	ʙ	ɓ	ɗ	ɗ	ɠ	ɢ	æ	ç	"Ex
´35x	ħ	ɟ	ſ	ɬ	ɫ	ɭ	ɰ	ɳ	
´36x	ɴ	ɲ	Θ	ɽ	ɹ	ɻ	ʀ	œ	"Fx
´37x	ø	ṣ	ʈ	ʍ	ẓ	ẓ	þ	ʱ	
	"8	"9	"A	"B	"C	"D	"E	"F	

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E.2 `tipasl10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	^	~	¨	″	°	˘	"0x
´01x	˘	–	·	ˌ	˷	‶	`	´	
´02x	^	⊓	⊔	□	⊃	⊂	ω	~	"1x
´03x	×	ɪ	ɟ	+	⊥	⊤	⊣	⊢	
´04x	´	!	ˈ	˞	ˌ	ˬ	~	'	"2x
´05x	(	)	*	+	,	-	.	/	
´06x	ʉ	ɨ	ʌ	ɜ	ɥ	ɐ	ɒ	ɤ	"3x
´07x	ɵ	ə	:	·	‿	=	⌢	?	
´10x	ə	ɑ	β	ç	ð	ε	ɸ	ɣ	"4x
´11x	ɦ	ɪ	ʝ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʔ	ʕ	ɾ	ʃ	θ	ʊ	υ	ɯ	"5x
´13x	χ	ʏ	ʒ	[	ʻ	]	˹	˺	
´14x	'	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	‖			ǂ	˘	ˌ	
´20x	˗	ˎ	ˏ	ˊ	ˋ	´	´	/	"8x
´21x	/	ˍ	ˋ	ˎ	ˏ	ˌ	´	/	
´22x	/	/			‖	↓	↑	↗	↘	"9x
´23x	˘	˛	˜	~	'	″	˚	˟	
´24x	ƀ	đ	ɖ	ɗ	ᴇ	g	ɩ	ɭ	"Ax
´25x	ᴊ	ʶ	ł	λ	ƛ	ɓ	ɳ	æ	
´26x	ω	Ω	ʃ	ƫ	ƭ	ts	ɥ	ɥ	"Bx
´27x	ʒ	ɞ	Ƅ	Ҍ	ʔ	˂	˃	/	
´30x	ᴀ	ć	ʗ	ʤ	ɚ	ɜ	ʒ	ʒ˞	"Cx
´31x	ʏ	ǵ	ɦ	ʜ	ɩ	ᴊ	ḱ	ʟ	
´32x	ʞ	ɷ	ƥ	ƈ	ɽ	ɪ	ƭ	œ	"Dx
´33x	ɟ	tʃ	ᴜ	ƽ	ʔ	ʕ	ʐ	ρ	
´34x	ʙ	ɓ	ɗ	ɖ	ɟ	ɢ	æ	ç	"Ex
´35x	ħ	ɟ	f	ɫ	ƚ	l	ɰ	η	
´36x	ɴ	ɲ	Θ	ʈ	ɹ	ɻ	ʀ	œ	"Fx
´37x	ø	ʂ	ʈ	ʍ	ẓ	ʑ	þ	ɦʋ	
	"8	"9	"A	"B	"C	"D	"E	"F	

E.3 `tipabx10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	^	~	¨	˝	°	˘	"0x
´01x	˘	¯	·	ˌ	˛	‶	`	´	
´02x	^	⊓	⊔	□	˒	˓	◡	~	"1x
´03x	˟	ı	J	+	⊥	⊤	⊣	⊢	
´04x	´	!	'	˞	˳	ˬ	~	'	"2x
´05x	(	)	*	+	,	-	·	/	
´06x	ʉ	ɨ	ʌ	ɜ	ɥ	ɐ	ɒ	ɤ	"3x
´07x	θ	ə	:	·	‿	=	⁀	?	
´10x	ə	ɑ	β	ç	ð	ɛ	ɸ	ɣ	"4x
´11x	ɦ	ɪ	ɟ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʔ	ʕ	ɾ	ʃ	θ	ʊ	ʋ	ɯ	"5x
´13x	χ	ʏ	ʒ	[	ˤ	]	˥	˩	
´14x	ʻ	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	‖	│	‡	˷	ˌ	
´20x	‗	ˎ	ˋ	＼	＼	ˏ	ˊ	／	"8x
´21x	／	ˍ	ˎ	＼	＼	＼	ˏ	／	
´22x	／	／	│	‖	↓	↑	↗	↘	"9x
´23x	˘	˻	˜	~	'	"	˵	˶	
´24x	ƀ	đ	ɖ	ʥ	ᴇ	g	ɺ	ɻ	"Ax
´25x	ɹ	ʶ	ɬ	λ	⅄	ɮ	ɳ	æ	
´26x	ω	Ω	ʆ	ʈ	ɫ	ts	ɥ	ɥ	"Bx
´27x	ʓ	ɛ	ʙ	ʚ	ˀ	˂	˃	ǀ	
´30x	ᴀ	ƈ	ʗ	ʤ	ɚ	ɘ	ɞ	ɝ	"Cx
´31x	ɤ	ɠ	ɦ	ʜ	ɩ	ɟ	ƙ	ʟ	
´32x	ʛ	ɷ	ɓ	ʠ	ɼ	ɪ	ƭ	œ	"Dx
´33x	ɨ	ʧ	ᴜ	ʅ	ʡ	ʢ	ʐ	ρ	
´34x	ʙ	ɓ	ɗ	ɖ	ɠ	ɢ	æ	ç	"Ex
´35x	ħ	ɉ	ʄ	ɬ	ł	ɭ	ɰ	ɳ	
´36x	ɴ	ɲ	Θ	ɽ	ɹ	ɻ	ʀ	œ	"Fx
´37x	ø	ʂ	ʈ	ʍ	ʐ	ʑ	þ	ʍ	
	"8	"9	"A	"B	"C	"D	"E	"F	

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E.4 tipass10

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	^	~	¨	″	°	ˇ	″0x
´01x	˘	¯	·	ˌ	˓	˵	ˋ	ˊ	
´02x	ˆ	˷	˷	˯	˒	˓	˶	˜	″1x
´03x	ˣ	ǀ	ǰ	˖	˗	˔	˕	˞	
´04x	ʹ	!	ˈ	˞	ˌ	˴	˜	ˏ	″2x
´05x	(	)	*	+	,	-	.	/	
´06x	ʉ	ɨ	ʌ	ɜ	ɥ	ɵ	ɒ	ʁ	″3x
´07x	ɵ	ə	ː	ˈ	‿	=	⁀	?	
´10x	ə	ɑ	β	ɕ	ð	ɛ	ɸ	ɣ	″4x
´11x	ɦ	ɪ	ʝ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʔ	ʕ	ɾ	ʃ	θ	ʊ	ʋ	ɯ	″5x
´13x	χ	ʏ	ʒ	[	ˈ	]	˞	˞	
´14x	ʻ	a	b	c	d	e	f	g	″6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	″7x
´17x	x	y	z	‖	ǀ	ǂ	˞	ˌ	
´20x	ˍ	ˋ	ˎ	ˏ	ˌ	ˊ	ˊ	ˊ	″8x
´21x	ˊ	ˍ	ˋ	ˎ	ˏ	ˌ	ˊ	ˊ	
´22x	ˊ	ˊ	ǀ	‖	↓	↑	↗	↘	″9x
´23x	ˬ	ˬ	˷	~	ˈ	″	˵	˶	
´24x	ɓ	ɗ	ʠ	ʄ	ᴇ	g	ɺ	ɻ	″Ax
´25x	ɹ	ʞ	ɬ	λ	ƛ	ß	ɳ	æ	
´26x	ω	Ω	ʆ	ʈ	ɫ	ts	ɥ	ɥ	″Bx
´27x	ᴣ	ɛ	ʙ	ʀ	ˀ	˂	˃	ǀ	
´30x	ᴀ	ʗ	ʖ	ʥ	ɚ	ɘ	ɞ	ɝ	″Cx
´31x	ʏ	ɢ	ɧ	ʜ	ɩ	ɟ	ʀ	ʟ	
´32x	ʤ	ɷ	ƥ	ɗ	ɽ	ɿ	ʦ	Œ	
´33x	ɻ	ʧ	ʊ	ʓ	ʔ	ʕ	ʐ	ρ	″Dx
´34x	ʙ	ɓ	ɖ	ɗ	ʄ	ɢ	æ	ç	″Ex
´35x	ħ	ɟ	ʃ	ɬ	ɫ	ɭ	ɰ	ɲ	
´36x	ɴ	ɲ	Ɵ	ɾ	ɹ	ɭ	ʀ	œ	″Fx
´37x	ø	ʂ	ʈ	ʍ	ʐ	ʑ	þ	ɦ	
	″8	″9	″A	″B	″C	″D	″E	″F	

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	^	~	¨	˝	˚	ˇ	"0x
´01x	˘	¯	˙	¸	ˎ	˵	ˋ	ˏ	
´02x	⌢	˹	˻	˳	˒	˓	˯	˷	"1x
´03x	˟	ı	ȷ	˖	˕	˧	˦	�	
´04x	´	!	ˈ	˞	ˌ	ˬ	˜	’	"2x
´05x	(	)	*	+	,	-	.	/	
´06x	ʉ	ɨ	ʌ	ɜ	ɥ	ɘ	ɒ	ɤ	"3x
´07x	ɵ	ə	ː	ˑ	‿	=	⁀	?	
´10x	ə	ɑ	β	ɕ	ð	ɛ	ɸ	ɣ	"4x
´11x	ɦ	ɪ	ɟ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʔ	ʕ	ɾ	ʃ	θ	ʊ	ʋ	ɯ	"5x
´13x	χ	ʏ	ʒ	[	ˈ	]	˺	˻	
´14x	‘	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	‖	ǀ	ǂ	˷	ˌ	
´20x	˗	ˎ	ˋ	ˏ	ˊ	ˏ	ˊ	ˊ	"8x
´21x	ˊ	ˍ	ˎ	ˏ	ˏ	ˏ	ˏ	ˊ	
´22x	ˊ	ˊ	ǀ	‖	↓	↑	↗	↘	"9x
´23x	ˏ	ˋ	˜	~	ˈ	˝	˯	ˮ	
´24x	ɓ	ɗ	ɖ	ʈ	ᴇ	g	�́	ɭ	"Ax
´25x	ᴊ	ʞ	ɬ	ƛ	ʎ	ʄ	ɳ	æ	
´26x	ω	Ω	ʆ	ʈ	ɫ	ts	ɥ	ʮ	"Bx
´27x	ʒ	ɛ	ᵬ	ᵭ	ˀ	˂	˃	ǀ	
´30x	ᴀ	ƈ	ʗ	ʤ	ɚ	ɞ	ɢ	ɝ	"Cx
´31x	ʁ	ɠ	ɧ	ʜ	ɩ	ɟ	ƙ	ʟ	
´32x	ʛ	ɷ	ƥ	ƈ	ɼ	ɺ	ƒ	œ	"Dx
´33x	ɻ	ʧ	ᴜ	ʅ	ʡ	ʢ	ʐ	ρ	
´34x	ʙ	ɓ	ɗ	ɖ	ɡ	ɢ	æ	ç	"Ex
´35x	ħ	ɟ	ʄ	ɫ	ɬ	ɭ	ɰ	η	
´36x	ɴ	ɲ	ɵ	ɽ	ɹ	ɺ	ʀ	œ	"Fx
´37x	ø	ʂ	ʈ	ʍ	ʐ	ʑ	þ	ʍ	
	"8	"9	"A	"B	"C	"D	"E	"F	

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E.6   `tipatt10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	`	´	^	~	¨	˝	°	˘	"0x
´01x	˘	¯	·	˒	˓	˵	ˋ	ˏ	
´02x	ˆ	˻	˼	˳	˒	˓	˷	˜	"1x
´03x	˝	ɩ	ʝ	⊥	⊥	⊤	⊢	⊦	
´04x	´	!	'	ˆ	˪	˩	˜	'	"2x
´05x	(	)	*	+	,	-	.	/	
´06x	ʉ	ɨ	ʌ	ȝ	ɥ	ɐ	ɒ	ɤ	"3x
´07x	ɵ	ə	ː	˙	�‿	=	⌢	?	
´10x	ə	ɑ	β	ɕ	ð	ɛ	ɸ	ɣ	"4x
´11x	ɦ	ɪ	ɟ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʔ	ʕ	ɾ	ʃ	θ	ʊ	ʋ	ɯ	"5x
´13x	χ	ʏ	ʒ	[	'	]	˥	˩	
´14x	'	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	‖	|	ǂ	˷	ˌ	
´20x	˗	˴	˳	˲	˱	ˏ	ˎ	ˊ	"8x
´21x	ˋ	˗	˵	˶	˷	˸	ˏ	ˎ	
´22x	ˊ	ˋ	|	‖	↓	↑	↗	↘	"9x
´23x	˘	˛	˜	˜	˙	¨	˵	˶	
´24x	ɓ	ɗ	ᶁ	ʠ	ᴇ	ɡ	ɺ	ɻ	"Ax
´25x	ɾ	ʮ	ɫ	λ	ʎ	ɦ	ɳ	æ	
´26x	ω	Ω	ʆ	ʦ	ʨ	ʦ	ɥ	ʮ	"Bx
´27x	ʓ	ɜ	ʙ	ʚ	ˀ	˂	˃	|	
´30x	ᴀ	ɕ	ʗ	ʤ	ɚ	ɘ	ɢ	ɝ	"Cx
´31x	ʏ	ɠ	ɧ	ʜ	ɩ	ɟ	ʞ	ʟ	
´32x	ɮ	ɷ	ƥ	ʠ	ɼ	ɪ	ʨ	œ	"Dx
´33x	ɹ	ʧ	ᴜ	ʬ	ʡ	ʢ	ʐ	ᴘ	
´34x	ʙ	ɓ	ɗ	ᶁ	ɠ	ɢ	æ	ç	"Ex
´35x	ħ	ɟ	ʄ	ɬ	ɫ	ɭ	ɰ	ɳ	
´36x	ɴ	ɲ	θ	ʈ	ɪ	ɻ	ʀ	œ	"Fx
´37x	ø	ʂ	ʈ	ʍ	ʐ	ʑ	þ	ʍ	
	"8	"9	"A	"B	"C	"D	"E	"F	

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E.7 xipa10

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	ˋ	´	ˆ	˜	¨	˝	˚	˘	"0x
´01x	˘	¯	˙	ˌ	ˏ	˶	ˋ	´	
´02x	ˆ	⊓	⊔	⊡	ˎ	˓	ω	˷	"1x
´03x	˟	ɪ	ȷ	⊥	⊤	⊤	⊣	⊢	
´04x	′	ǃ	ˈ	˞	˷	˵	˜	˒	"2x
´05x	(	)	*	+	,	-	.	/	
´06x	ʉ	ɨ	ʌ	ɜ	ɥ	ɐ	ɒ	ɤ	"3x
´07x	ɵ	ə	ː	˙	⌣	=	⌢	ʔ	
´10x	ə	ɑ	β	ç	ð	ɛ	ɸ	ɣ	"4x
´11x	ɦ	ɪ	ɟ	ʁ	ʎ	ɱ	ŋ	ɔ	
´12x	ʡ	ʕ	ɾ	ʃ	θ	ʊ	ʋ	ɯ	"5x
´13x	χ	ʏ	ʒ	[	ˊ	]	˥	˩	
´14x	ˋ	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	‖	∣	ǂ	˞	ˌ	
´20x	ˍ	ˋ	ˋ	ˋ	ˋ	ˊ	ˊ	ˊ	"8x
´21x	ˊ	ˍ	ˋ	ˋ	ˋ	ˋ	ˊ	ˊ	
´22x	ˊ	ˊ	∣	‖	↓	↑	↗	↘	"9x
´23x	˵	˵	˵	˜	ˈ	ˮ	˵	˵	
´24x	ɓ	đ	ɗ	ɖ	ᴇ	g	ɺ	ɭ	"Ax
´25x	ᴊ	ʞ	ɫ	λ	ƛ	ɮ	ɳ	æ	
´26x	ω	Ω	ʆ	ʈ	ɬ	ts	ɥ	ɥ	"Bx
´27x	ʐ	ɛ̃	ь	ꞵ	ˀ	˂	˃	ǀ	
´30x	ᴀ	ć	ʗ	ʤ	ɚ	ɞ	ɜ	ɝ	"Cx
´31x	ɤ	ɠ	ɦ	ʜ	ɩ	ɟ	ƙ	ʟ	
´32x	ʠ	ɷ	ɸ	ʠ	ꞁ	ɪ	ɟ	œ	"Dx
´33x	ɻ	ʧ	ᴜ	ʃ	ʡ	ʕ	ʑ	p	
´34x	ʙ	ɓ	ɗ	ɖ	ɠ	ɢ	æ	ç	"Ex
´35x	ħ	ɟ	ʄ	ɬ	ɫ	ɭ	ɰ	ɳ	
´36x	ɴ	ɲ	ɵ	ʈ	ɹ	ɻ	ʀ	œ	"Fx
´37x	ø	ṣ	ţ	ʍ	ẓ	ʐ	þ	ɦ	
	"8	"9	"A	"B	"C	"D	"E	"F	

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E.8 tipx10

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	˒	ˌ	˩	˧	▫	←	⊢	↓	"0x
´01x	↑	→	↔						
´04x	a̢	ɑ	æ	ɟ	c	ʆ	ç	ɗ	"2x
´05x	ɗ	ɖ	e̢	ɛ̢	ɣ	ɣ	ɣ	ɦ̢	
´06x	ɦ	ɩ	j	ʃ	ɦ	ɲ	ŋ	♀	"3x
´07x	♀	⊙	ʚ	ω	p	ɸ	ʆ	ⱦ	
´10x	ɟ	ʐ	ʒ	ɛ	ʕ	ʓ	|	‖	"4x
´11x	ǂ								
´12x	þ	þ	þ	þ					"5x
´13x									
´16x	∀	Æ	Δ	ꟻ	ʞ	ᴙ	⅃	ꟽ	"7x
´17x	ꟼ	Ꝺ	Я	Ո					
	"8	"9	"A	"B	"C	"D	"E	"F	

E.9 tipxsl10

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	˒	ˌ	˩	˧	▫	←	⊢	↓	"0x
´01x	↑	→	↔						
´04x	a̢	ɑ	æ	ɟ	c	ʆ	ç	ɗ	"2x
´05x	ɗ	ɖ	e̢	ɛ̢	ɣ	ɣ	ɣ	ɦ̢	
´06x	ɦ	ɩ	j	ʃ	ɦ	ɲ	ŋ	♀	"3x
´07x	♀	⊙	ʚ	ω	p	ɸ	ʆ	ⱦ	
´10x	ɟ	ʐ	ʒ	ɛ	ʕ	ʓ	|	‖	"4x
´11x	ǂ								
´12x	þ	þ	þ	þ					"5x
´13x									
´16x	∀	Æ	Δ	ꟻ	ʞ	ᴙ	⅃	ꟽ	"7x
´17x	ꟼ	Ꝺ	Я	Ո					
	"8	"9	"A	"B	"C	"D	"E	"F	

E.10 `tipxbx10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	˒	˪	ˬ	˴	▫	←	⋈	↓	″0x
´01x	↑	→	↔						
´04x	a̗	ɑ	æ	ɹ	ɔ	ʃ	ɕ	ᶑ	″2x
´05x	ɗ	ȸ	e̗	ɛ̗	ɣ	ʏ	ɤ	ɧ	″3x
´06x	ɦ	ɿ	ɟ	ʄ	ɯ	ɲ	ŋ	♀	
´07x	♀	☉	ɔ̗	ɷ	℘	ȹ	ɭ	ʈ	″3x
´10x	ɻ	ƹ	ȝ	ɛ	ɂ	ɀ	ǀ	ǁ	″4x
´11x	ǂ								
´12x	þ	þ	þ	þ					″5x
´13x									
´16x	∀	Æ	∆	ꜰ	ᴋ	ꟻ	ꞁ	ꟽ	″7x
´17x	ꟼ	ꞯ	я	∩					
	″8	″9	″A	″B	″C	″D	″E	″F	

E.11 `tipxss10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	˒	˪	ˬ	˴	▫	←	–	↓	″0x
´01x	↑	→	↔						
´04x	ą	ɑ	æ	ɹ	ɔ	ʃ	ɕ	ᶑ	″2x
´05x	ɗ	ȸ	e̗	ɛ̗	ɣ	ʏ	ɤ	ɧ	″3x
´06x	ɦ	ɿ	ɟ	ʄ	ɯ	ɲ	ŋ	♀	
´07x	♀	☉	ɔ̗	ɷ	℘	ȹ	ɭ	ʈ	″3x
´10x	ɻ	ƹ	ȝ	ɛ	ɂ	ɀ	ǀ	ǁ	″4x
´11x	ǂ								
´12x	þ	þ	þ	þ					″5x
´13x									
´16x	∀	Æ	∆	ꜰ	ᴋ	ꟻ	ꞁ	ꟽ	″7x
´17x	ꟼ	ꞯ	я	∩					
	″8	″9	″A	″B	″C	″D	″E	″F	

E.12 `tipxtt10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	˻	˻	ˌ	ˎ	˗	←	⊢	↓	″0x
´01x	↑	→	↔						
´04x	a̡	ɑ	æ	⅄	ꞔ	ʆ	ɕ	ɖ	″2x
´05x	ꝺ	ɖ	e̡	ɛ̡	ɣ	ɤ	ɤ	ɧ	
´06x	ɦ	ɪ	ɟ	ʃ	ɰ	ɱ	ŋ	♀	″3x
´07x	♀	⊙	ɷ	ɷ	ρ	φ	ɭ	ɬ	
´10x	ⱬ	ƻ	ʒ	ƺ	♄	ꝛ	|	‖	″4x
´11x	ǂ								
´12x	þ	þ	þ	þ					″5x
´13x									
´16x	∀	Ɑ	Δ	ꟻ	ʞ	ʞ	⅃	ꟽ	″7x
´17x	ꟼ	Ọ	Я	∩					
	″8	″9	″A	″B	″C	″D	″E	″F	

E.13 `xipx10`

	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	˻	˻	ˌ	ˎ	˗	←	⊢	↓	″0x
´01x	↑	→	↔						
´04x	a̡	ɑ	æ	⅄	ꞔ	ʆ	ɕ	ɖ	″2x
´05x	ꝺ	ɖ	e̡	ɛ̡	ɣ	ɤ	ɤ	ɧ	
´06x	ɦ	ɪ	ɟ	ʃ	ɰ	ɱ	ŋ	♀	″3x
´07x	♀	⊙	ɷ	ɷ	ρ	φ	ɭ	ɬ	
´10x	ⱬ	ƻ	ʒ	ƺ	♄	ꝛ	|	‖	″4x
´11x	ǂ								
´12x	þ	þ	þ	þ					″5x
´13x									
´16x	∀	Ɑ	Δ	ꟻ	ʞ	ʞ	⅃	ꟽ	″7x
´17x	ꟼ	Ọ	Я	∩					
	″8	″9	″A	″B	″C	″D	″E	″F	

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