

Annotations

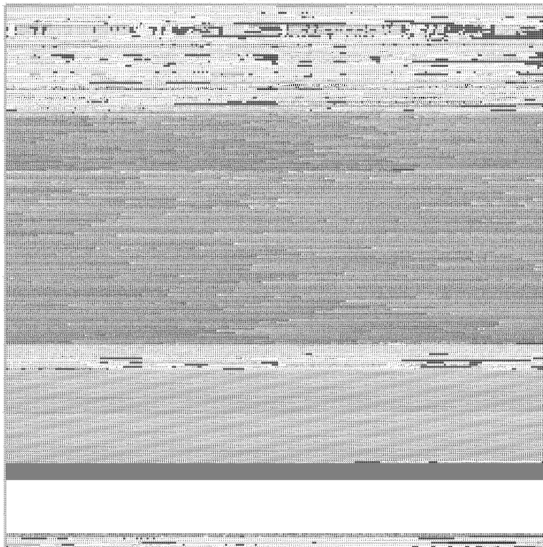
Why use IPA for annotations?

Encoding

- ▶ IPA symbols in Unicode (latin character, IPA extensions, Phonetic extensions)
- ▶ Whats the problem?
- ▶ different character encoding schemes:
 - ▶ ASCII
 - ▶ UTF-8
 - ▶ UTF-16
 - ▶ UTF-32

ASCII Table

| Dec | Hex | Oct | Char | Dec | Hex | Oct | Char | Dec | Hex | Oct | Char | Dec | Hex | Oct | Char |
|-----|-----|-----|------|-----|-----|-----|---------|-----|-----|-----|------|-----|-----|-----|------|
| 0 | 0 | 0 | | 32 | 20 | 40 | [space] | 64 | 40 | 100 | @ | 96 | 60 | 140 | ` |
| 1 | 1 | 1 | | 33 | 21 | 41 | ! | 65 | 41 | 101 | A | 97 | 61 | 141 | a |
| 2 | 2 | 2 | | 34 | 22 | 42 | " | 66 | 42 | 102 | B | 98 | 62 | 142 | b |
| 3 | 3 | 3 | | 35 | 23 | 43 | # | 67 | 43 | 103 | C | 99 | 63 | 143 | c |
| 4 | 4 | 4 | | 36 | 24 | 44 | \$ | 68 | 44 | 104 | D | 100 | 64 | 144 | d |
| 5 | 5 | 5 | | 37 | 25 | 45 | % | 69 | 45 | 105 | E | 101 | 65 | 145 | e |
| 6 | 6 | 6 | | 38 | 26 | 46 | & | 70 | 46 | 106 | F | 102 | 66 | 146 | f |
| 7 | 7 | 7 | | 39 | 27 | 47 | ' | 71 | 47 | 107 | G | 103 | 67 | 147 | g |
| 8 | 8 | 10 | | 40 | 28 | 50 | (| 72 | 48 | 110 | H | 104 | 68 | 150 | h |
| 9 | 9 | 11 | | 41 | 29 | 51 |) | 73 | 49 | 111 | I | 105 | 69 | 151 | i |
| 10 | A | 12 | | 42 | 2A | 52 | * | 74 | 4A | 112 | J | 106 | 6A | 152 | j |
| 11 | B | 13 | | 43 | 2B | 53 | + | 75 | 4B | 113 | K | 107 | 6B | 153 | k |
| 12 | C | 14 | | 44 | 2C | 54 | , | 76 | 4C | 114 | L | 108 | 6C | 154 | l |
| 13 | D | 15 | | 45 | 2D | 55 | - | 77 | 4D | 115 | M | 109 | 6D | 155 | m |
| 14 | E | 16 | | 46 | 2E | 56 | . | 78 | 4E | 116 | N | 110 | 6E | 156 | n |
| 15 | F | 17 | | 47 | 2F | 57 | / | 79 | 4F | 117 | O | 111 | 6F | 157 | o |
| 16 | 10 | 20 | | 48 | 30 | 60 | 0 | 80 | 50 | 120 | P | 112 | 70 | 160 | p |
| 17 | 11 | 21 | | 49 | 31 | 61 | 1 | 81 | 51 | 121 | Q | 113 | 71 | 161 | q |
| 18 | 12 | 22 | | 50 | 32 | 62 | 2 | 82 | 52 | 122 | R | 114 | 72 | 162 | r |
| 19 | 13 | 23 | | 51 | 33 | 63 | 3 | 83 | 53 | 123 | S | 115 | 73 | 163 | s |
| 20 | 14 | 24 | | 52 | 34 | 64 | 4 | 84 | 54 | 124 | T | 116 | 74 | 164 | t |
| 21 | 15 | 25 | | 53 | 35 | 65 | 5 | 85 | 55 | 125 | U | 117 | 75 | 165 | u |
| 22 | 16 | 26 | | 54 | 36 | 66 | 6 | 86 | 56 | 126 | V | 118 | 76 | 166 | v |
| 23 | 17 | 27 | | 55 | 37 | 67 | 7 | 87 | 57 | 127 | W | 119 | 77 | 167 | w |
| 24 | 18 | 30 | | 56 | 38 | 70 | 8 | 88 | 58 | 130 | X | 120 | 78 | 170 | x |
| 25 | 19 | 31 | | 57 | 39 | 71 | 9 | 89 | 59 | 131 | Y | 121 | 79 | 171 | y |
| 26 | 1A | 32 | | 58 | 3A | 72 | : | 90 | 5A | 132 | Z | 122 | 7A | 172 | z |
| 27 | 1B | 33 | | 59 | 3B | 73 | ; | 91 | 5B | 133 | [| 123 | 7B | 173 | { |
| 28 | 1C | 34 | | 60 | 3C | 74 | < | 92 | 5C | 134 | \ | 124 | 7C | 174 | |
| 29 | 1D | 35 | | 61 | 3D | 75 | = | 93 | 5D | 135 |] | 125 | 7D | 175 | } |
| 30 | 1E | 36 | | 62 | 3E | 76 | > | 94 | 5E | 136 | ^ | 126 | 7E | 176 | ~ |
| 31 | 1F | 37 | | 63 | 3F | 77 | ? | 95 | 5F | 137 | _ | 127 | 7F | 177 | |



| character | encoding | bits |
|-----------|----------|-------------------------------------|
| A | UTF-8 | 01000001 |
| A | UTF-16 | 00000000 01000001 |
| A | UTF-32 | 00000000 00000000 00000000 01000001 |
| あ | UTF-8 | 11100011 10000001 10000010 |
| あ | UTF-16 | 00110000 01000010 |
| あ | UTF-32 | 00000000 00000000 00110000 01000010 |

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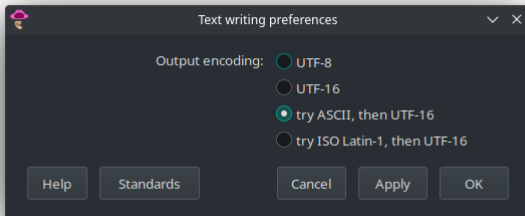
- ▶ How many glyphs?

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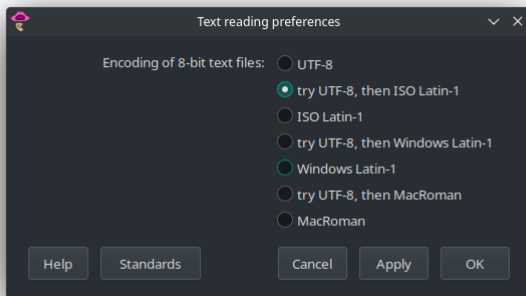
- ▶ How many glyphs?
- ▶ U+00E7
- ▶ c (U+0063) + ¸ (U+0328)

- ▶ ASCII and UTF-8 are compatible
- ▶ UTF-16 is not compatible with UTF-8
- ▶ but:
 - ▶ UTF-8 with or without BOM
 - ▶ UTF-16 Big Endian (Mac) vs UTF-16 Little Endian (Windows) (UNIX vs NUXI)
- ▶ Why is this important?
 - ▶ archiving of your data
 - ▶ data sharing with collaborators

Text encoding in Praat (text writing)



Text encoding in Praat (text reading)



Recommendations

- ▶ uniform encoding
- ▶ X-Sampa

THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)
















CONSONANTS (PULMONIC)

WITH X-SAMPA EQUIVALENTS IN BLUE

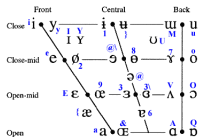
| | Bilabial | Labiodental | Dental | Alveolar | Postalveolar | Retroflex | Palatal | Velar | Uvular | Pharyngeal | Glottal |
|---------------------|-------------------|-------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Plosive | p b | | | t d | | ʈ ɖ | c ɟ | k g | q ɢ | | ʔ |
| Nasal | m | ɱ | | n | | ɳ | ɲ | ŋ | ɴ | | |
| Trill | ʙ | | | r | | | | | ʀ | | |
| Tap or Flap | | | | ɾ | | | | | | | |
| Fricative | ɸ β | f v | θ ð | s z | ʃ ʒ | ʂ ʐ | ç ʝ | x χ | χ ʁ | ħ ʕ | h ɦ |
| Lateral fricative | | | | ɬ ɮ | | | | | | | |
| Approximant | | ʋ (or ʌ) | | ɹ | | ɻ | j | ɰ | | | |
| Lateral approximant | | | | l | | ɭ | ʎ | ʟ | | | |

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

| Clicks | Voiced implosives | Ejectives |
|--|--|---|
|  Bilabial |  Bilabial <i>b</i> < |  as in: |
|  Dental |  Dental/alveolar <i>d</i> < |  Bilabial <i>p</i> > |
|  (Postalveolar) |  Palatal <i>j</i> < |  Dental/alveolar <i>t</i> |
|  Palatoalveolar |  Velar <i>g</i> < |  Velar <i>k</i> > |
|  Alveolar lateral |  Uvular <i>ʁ</i> < |  Alveolar fricative <i>s</i> > |

VOWELS



Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

| | | | |
|----------|-----------------------------------|------------|------------------------------------|
| W | Voicelless labial-velar fricative | ʧ ʤ | Alveolo-palatal fricatives |
| w | Voiced labial-velar approximant | ɺ | Alveolar lateral flap |
| H | Voiced labial-palatal approximant | ɧ | Simultaneous f and x |

SUPRASEGMENTALS

| | | TONES & WORD ACCENTS | |
|------------------------------|---|----------------------|----------------------|
| | | CONTOUR | |
| Primary stress | ' | ˉ | Extra high ˉ |
| Secondary stress | ˈ | ˊ | ˊ Falling ˊ |
| Long | ː | ˉ | ˉ High ˉ |
| Half-long | ˑ | ˊ | ˊ Mid-M ˊ |
| Extra-short | ˑ | ˊ | ˊ High rising ˊ |
| Syllable break | ˑ | ˊ | ˊ Low ˊ |
| Minor (foot) group | ˑ | ˊ | ˊ Rising-falling ˊ |
| Major (intonation) group | ˑ | ˊ | ˊ Downstep ˊ |
| Linking (absence of a break) | ˑ | ˊ | ˊ Global rise etc. ˊ |
| | | ˊ | ˊ Global fall ˊ |

DIACRITICS

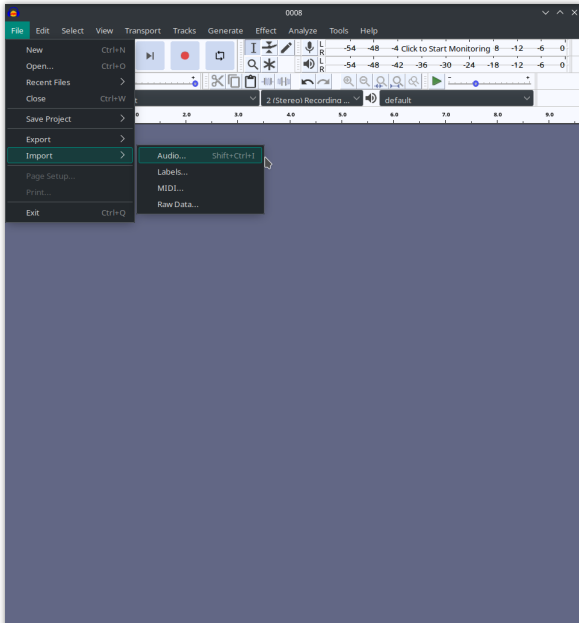
X-SAMPA diacritics come after symbols, e.g. n_0

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. η

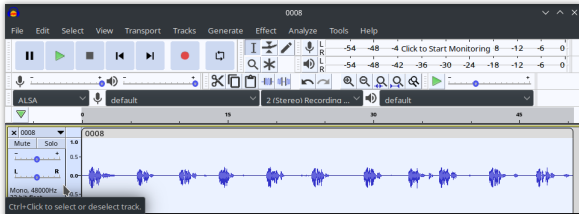
| | | | | | |
|--|---|--|--|---|---|
| $\overset{0}{\underset{\sim}{\text{h}}}$ Voiceless | $\overset{0}{\underset{\sim}{\text{h}}}$ d | $\overset{0}{\underset{\sim}{\text{h}}}$ Breathily voiced | $\overset{0}{\underset{\sim}{\text{h}}}$ b | $\overset{0}{\underset{\sim}{\text{h}}}$ Dental | $\overset{0}{\underset{\sim}{\text{h}}}$ d |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Voiced | $\overset{0}{\underset{\sim}{\text{h}}}$ t | $\overset{0}{\underset{\sim}{\text{h}}}$ Creakily voiced | $\overset{0}{\underset{\sim}{\text{h}}}$ b | $\overset{0}{\underset{\sim}{\text{h}}}$ Apical | $\overset{0}{\underset{\sim}{\text{h}}}$ d |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Aspirated | $\overset{0}{\underset{\sim}{\text{h}}}$ d ^h | $\overset{0}{\underset{\sim}{\text{h}}}$ Labiodental | $\overset{0}{\underset{\sim}{\text{h}}}$ f | $\overset{0}{\underset{\sim}{\text{h}}}$ Laminal | $\overset{0}{\underset{\sim}{\text{h}}}$ d |
| $\overset{0}{\underset{\sim}{\text{h}}}$ More rounded | $\overset{0}{\underset{\sim}{\text{h}}}$ w | $\overset{0}{\underset{\sim}{\text{h}}}$ Labialized | $\overset{0}{\underset{\sim}{\text{h}}}$ t ^w d ^w | $\overset{0}{\underset{\sim}{\text{h}}}$ Nasalized | $\overset{0}{\underset{\sim}{\text{h}}}$ e ^(or -) e ⁻ ē |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Less rounded | $\overset{0}{\underset{\sim}{\text{h}}}$ j | $\overset{0}{\underset{\sim}{\text{h}}}$ Palatalized | $\overset{0}{\underset{\sim}{\text{h}}}$ j ^j d ^j | $\overset{0}{\underset{\sim}{\text{h}}}$ Nasal release | $\overset{0}{\underset{\sim}{\text{h}}}$ d ^h |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Advanced | $\overset{0}{\underset{\sim}{\text{h}}}$ u | $\overset{0}{\underset{\sim}{\text{h}}}$ Velarized | $\overset{0}{\underset{\sim}{\text{h}}}$ t ^v d ^v | $\overset{0}{\underset{\sim}{\text{h}}}$ Lateral release | $\overset{0}{\underset{\sim}{\text{h}}}$ d ^l |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Retracted | $\overset{0}{\underset{\sim}{\text{h}}}$ ɰ | $\overset{0}{\underset{\sim}{\text{h}}}$ Pharyngealized | $\overset{0}{\underset{\sim}{\text{h}}}$ t ^ʕ d ^ʕ | $\overset{0}{\underset{\sim}{\text{h}}}$ No audible release | $\overset{0}{\underset{\sim}{\text{h}}}$ d ^ʔ |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Centralized | $\overset{0}{\underset{\sim}{\text{h}}}$ e | $\overset{0}{\underset{\sim}{\text{h}}}$ Velarized or pharyngealized | $\overset{0}{\underset{\sim}{\text{h}}}$ ɰ | $\overset{0}{\underset{\sim}{\text{h}}}$ (or velarized): l: ɰ | |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Mid-centralized | $\overset{0}{\underset{\sim}{\text{h}}}$ ɛ | $\overset{0}{\underset{\sim}{\text{h}}}$ Rained | $\overset{0}{\underset{\sim}{\text{h}}}$ e (ɰ = voiced alveolar fricative) | | |
| $\overset{0}{\underset{\sim}{\text{h}}}$ Syllabic (or -) | $\overset{0}{\underset{\sim}{\text{h}}}$ l | $\overset{0}{\underset{\sim}{\text{h}}}$ Lowered | $\overset{0}{\underset{\sim}{\text{h}}}$ e (β = voiced bilabial approximant) | | |

Hack for forced alignment

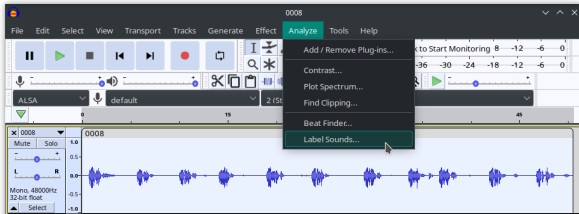
- Annotations
 - Hack for forced alignment



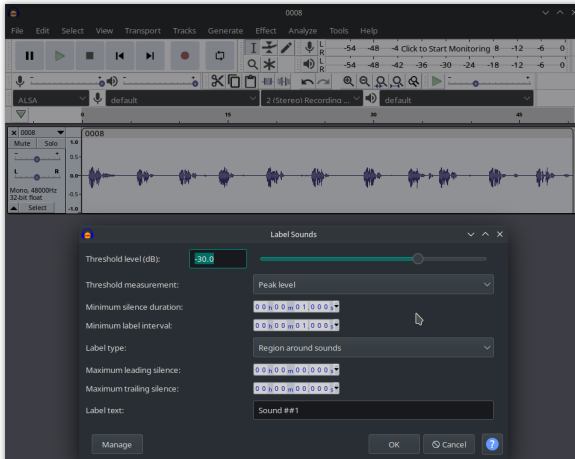
- Annotations
 - Hack for forced alignment



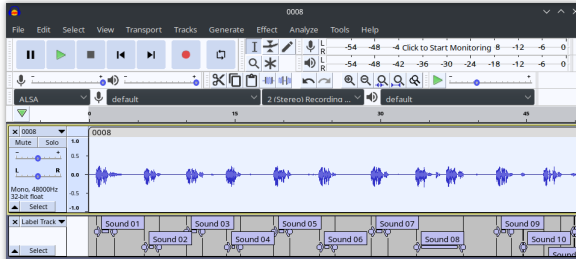
- Annotations
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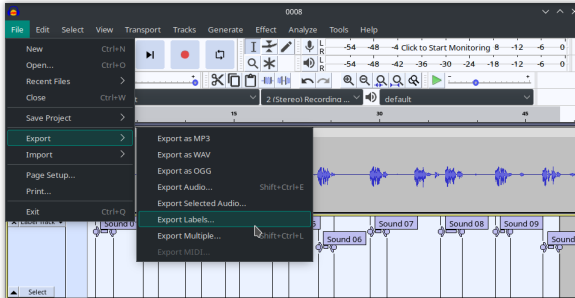
- Annotations
 - Hack for forced alignment



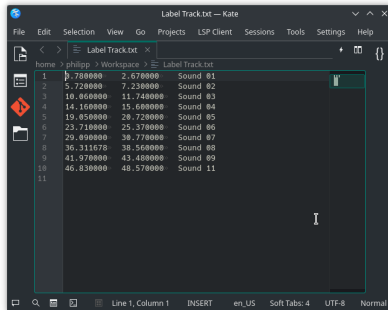
- Annotations
 - Hack for forced alignment



- Annotations
 - Hack for forced alignment



- Annotations
 - Hack for forced alignment



| | | | |
|----|-----------|-----------|----------|
| 1 | 5.780000 | 2.670000 | Sound 01 |
| 2 | 5.720000 | 7.230000 | Sound 02 |
| 3 | 10.060000 | 11.740000 | Sound 03 |
| 4 | 14.160000 | 15.600000 | Sound 04 |
| 5 | 19.050000 | 20.720000 | Sound 05 |
| 6 | 23.710000 | 25.370000 | Sound 06 |
| 7 | 29.090000 | 30.770000 | Sound 07 |
| 8 | 36.311678 | 38.560000 | Sound 08 |
| 9 | 41.970000 | 43.480000 | Sound 09 |
| 10 | 46.830000 | 48.570000 | Sound 10 |
| 11 | | | |

- ▶ use a script to extract the utterances of interest
- ▶ have one wav and one text file per utterance
- ▶ use the forced-alignment system of your choice