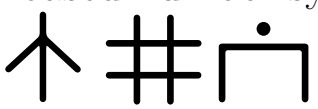
Power-based number system



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March 22, 2024

1 Power-based number system for toki pona

Written by jan loje with the help of jan Tamalu and Shaevor (mistakes are mine only)

This system should be:

1. based on the common positional-digit decimal system,
2. unambiguous,
3. easy to understand, learn, and use for all common non-scientific and non-mathematical purposes,
4. suitable for *toki pona*.

NOTES: < >: *read as*

2 Vocabulary

1	wan		one
2	tu		two
3	sin		three [3 lines]
4	lipu		four [4 sides]
5	luka		five [toki pona hand]
6	pipi		six [6 elements]
7	len		seven [4 sides + 3 lines]
8	musi		eight [two circles look like a kind of 8]
9	suli		nine [the ”big” digit]
10	sewi		10 (base) followed by integer powers (1 is implicit): 2, 3, 4,... [raise]
20	tu sewi		two × ten
30	sin sewi		three × ten
100	sewi tu		10^2
300	sin sewi tu		three × ten^2
1000	sewi sin		10^3
+	en		addition
-	weka		negative [toki pona subtract]
.	sike		separator for decimal part
№	nanpa		number prefix (ordinal)*
#	mute		number prefix (cardinal)

*NOTE: compare Philipino ika- or pang-, Malay and Indonesian ke-, Chinese 第

3 Use

3.1 Prefixes (when needed)

Ordinal and cardinal numbers

nanpa #: ordinal number
mute |||: cardinal number

O>#5 <*ona li nanpa luka*> it's the 5th (ordinal)
O>|||5 <*ona li mute luka*> it's 5 (cardinal)

3.2 Positional digits

The values of digits are *positional* (common usage)

That is $212 = 2 \times 10^2 + 1 \times 10^1 + 2 \times 10^0$

12 <*wan tu*>
2024 <*tu ala tu lipu*>

3.3 Numbers as powers of 10

***sewi* is the base 10 for all powers.**

$1000 = 10^3$ <*sewi sin*>
$10\ 000 = 10^4$ <*sewi lipu*>
...
$1\ 000\ 000\ 000 = 10^9$= *sewi suli*

O>e>>$1,000,000,000 <*jan li jo e mani Mewika pi mute sewi suli*>

3.4 Very large (or small) numbers

Very large (or small) numbers can be expressed easily.

a googol = 10^{100} <*sewi wan ala ala*> *or* 10^{10^2} <*sewi sewi tu*>

3.5 Composed numbers

Numbers with multiplicative and additive values.

The number to the left of *sewi* has multiplicative value.

The additive value of a number (sequence) is stated explicitly with *en*.

$4\ 000\ 000\ 012 = 4 \times 10^9 + 12$ <*lipu sewi suli en wan tu*>

3.6 Numbers with fractional parts

Number with a fractional part separated by a decimal point.

3.14 <*sin sike wan lipu*>

$3.14 = 314 \times 10^{-2}$ <*sin wan lipu sewi weka tu*>

3.7 Numbers with negative exponents

Negative exponents are prefixed by *weka*.

6.62×10^{-34} <*pipi sike pipi tu sewi weka sin lipu*>

3.8 Dates

ISO 8601 system

2024-05-12 <*tenpo sike tu ala tu lipu* ***en*** *tenpo mun luka* ***en*** *tenpo suno wan tu*>

5-12) <*tenpo mun luka en tenpo suno wan tu la ona li kama lon ale*> His birthday is May 12th

3.9 Conflict with other number systems

In other to reduce the conflict with other toki-pona number systems, the numbers could be written with the usual digits (0-9), i.e. not using toki pona numerals.