DOZENSONLINE FORUM:
SYMBOLS DEBATE

A. Introduction

Objectives of the Digest. This digest aims to bring one discussion thread at the DozensOnline internet forum regarding symbology to our readers' attention. From time to time we will visit the Forum to sample what others, some within our Societies and many outside of them, are discussing. A digest can't truly be a complete record of the proceedings of the Forum; it's only a sample, and samples can be party to bias. Posts cited here are in no way the only views on the Forum. You are welcome to visit the Forum and read the posts for yourself, and come to your own conclusions. Better still, you can add your own views to this or any other discussion thread.

About DozensOnline. Two individuals from the Dozenal Society of Great Britain maintain the DozensOnline Forum (retrievable in 2010 at http://z13.invisionfree.com/DozensOnline). The board is moderated by Mr. Parry and DSA Honorary Member Shaun Ferguson. The Forum was initiated 2 August 2005, by Mr. Bryan Parry. One may visit the board and read posts as a guest, however to start new discussion threads or to reply to posts, one needs to register. Anyone may join the Forum simply by registering a username and password; registration is free of charge. There are simple rules of etiquette posted within every subforum. At the time of writing, there were about one and a half gross members, only 15; of which have posted more than three dozen messages, and four have posted around three gross or more messages, out of a total of nearly two dozen six gross posts.

The discussion thread of interest in this digest is titled "Symbols for ten and eleven?", directly accessible by entering http://z13.invisionfree.com/DozensOnline/index.php?showtopic=11. We'll nickname this discussion thread "Topic 11" for simplicity. If you're familiar with the Forum, you can also navigate to this thread via the board index, clicking "On Topic", then "Number Bases", examining the menu until you see the discussion thread title, and then finally clicking on it. There are 101; posts in this thread.

Forums (fora) work a bit differently than some other literature formats. Firstly, only one's username appears to identify who's posted an item. We've indicated usernames by placing «double angle brackets» around the username. One can click on the username and get some information on the user, however, most users on the Forum have elected not to disclose their true identity. The true name of the contributor is used when known to the Editor, while some information about those contributors whose true identities are not explicitly revealed are included after their username. Secondly, all posts have a time stamp, and are sorted chronologically. Theoretically, one can find any post by knowing under which topic the post occurs, and the time stamp. For brevity, the time stamp is listed for each post citation, in the year-month-day-24 hour time format. Over time, content in the Forum, especially linked material, tends to be lost; this article cites the Forum as it appeared in June 2010. Finally, internet forum discussions tend to be informal; some of the text has been corrected so that it is understandable.

Some of this work derives from a document written by Mr. Ray Greaves, which can be found at http://base12.plus.com/DozensOnline/Symbols.doc, or at Topic 11 at time stamp 2006 0712 1058. This digest includes a broader scope of comments on the Forum. A more in-depth examination of the discussion of seven segment display numerals follows.

B. Selected Forum Statements Regarding Dozenal Numerals.

Bryan Parry (*«The Mighty Dozen», from Middlesex, England*)

2005 0802 2056: I personally favour the DSGB's symbols over the DSA's. However, whatever symbols we need should exist right now in fonts that are easily available.

2005 0803 1239: Cyrillic is useful because we don't use them in this country, of course. And the symbols 'slot' quite well into the Roman alphabet, mostly. Plus the symbols are easily available. And that point is key — new symbols is well and good (and is the ideal solution), but sadly, if we don't have those symbols in word or unicode, then how can we ever use them but by handwritten correspondences? It's not ideal, but *if* we can find good symbols that already exist, then we ar[e] on to a winner."

«Rosie» (*Born 1979, from Roehampton, England*)

2005 0803 1232: "My thinking is that the new symbols should be easy to write and not overlap with any other commonly used symbols (so I'd avoid Greek letters or those from the regular alphabet)."

Daniel White (*«Twinbee», from Bedford, England*)

2005 0806 1620: "I agree that it would be nice for them to not clash with any mathematical symbols. Below are some of my favourites. One or two of them are from the DSGB range. Others are borrowed from here and there (including this thread), and flipped, chopped and twisted. And a few of them I made myself. Some of them may look a bit weird initially, but I think you'll find that they look more like the numbers 0 – 9 than most symbols do. Aesthetically, I think that's quite important.

«finlay» (*Born 1987, British time zone*)

2005 0806 1008: "whatever we end up with, it should be writable with a single stroke of a pen or two short ones." «finlay» likes 'E' for eleven provided it is executable in "one stroke", as 'Ɛ'.

«Dan» (*Born 1982, from Houston, TX*)

2005 0814 1716: "First of all, [the numeral-candidates] should "look like" digits. Like the current decimal digits, they should be connected, and require the full height of the display. But, to prevent confusion, they should not be identical to the current digits (including the variant forms of 1, 6, 7, and 9). Symbols that differ from the current digits by only one segment should also be avoided, to avoid misreading broken displays. These rules reduce the number of possible 7-segment digits to sixteen:"

«DoubleG» (*Guillaume G., US Eastern time zone*)

2005 1208 1929: "[Some] worry about selecting characters among those found on keyboards (without too much acrobatics) and typewriters. First off, typewriters are a thing of the past. Secondly, this is way too restraining to do and pointlessly so. Same goes with calculator-style displays."

"Choosing among Greek characters would have frustrating consequences for math people, as has been noted. And broader interest just might be easier to get if people of various 'alphabetical-heritage' don't see conflict with the characters they already work with everyday. … Handwriting has to be easy and quick."

«Shaun» *(Shaun Ferguson, DSGB)*

2005 1211 1243: "1: The trouble with a handwritten x with a bar at the bottom [X] is that sloppy writing makes it look very much like an 8. I've known people who wrote their 4 starting at the bottom - making it look more like a 9. Whatever we choose will have to be something sloppy handwriting cannot spoil.

2: 'T' and 'E' — as someone else pointed out — are fine for the English-speaking world (Romance languages might prefer 'D', as in dix and diez). But they would do as a temporary standard if we can achieve agreement — which leads me on to

3: Apart from [Ɛ], which stood some chance of being acceptable to both DSGB and DSA until the DSA started using [Henry]Churchman's proposal of the 'hash' (also called 'octothorpe') [#] for eleven, there never has been agreement on the symbol for 'ten'. At one stage there was the possibility that a form of 'X' might do, as [Issac Pitman's Ↄ] was not acceptable to many, but the DSA abandoned [Dwiggin's χ] for the 'star' [*]. The hash and star might well be on the phone keyboard but that doesn't make them counting numbers."

[Point] 3 is the sticking point. We have been discussing the symbols for some sixty years and still haven't come up with two that are acceptable to the (small) group of people who make up the two societies. Maybe we need some sort of internet questionnaire aimed at everybody, along the lines of 'If you were asked to invent a single symbol to represent ten, what would you suggest?' noting in passing that 'A' is unacceptable."

«växan» *(Stockholm, Sweden)*

2006 0209 2008: "for new numerals to really work (in any number base) they must :
1. match the other (existing) numerals
2. work with 7-segment displays
3. be easy to write by hand with as few strokes as possible"

"so i would first suggest re-arranging 7-segment elements into shapes that are not mistaken for other numerals, and also that don't look like a burned out display element then take these shapes and work them into hand written numerals which match the other 9 indian numerals (yes they are indian, not arabic)"

"one obvious clue that a numeral is not working is that it stands out like a borg in a nudist camp [= like a sore thumb.]"

Andrew Patterson *(«Endi», European time zone)*

2006 0223 1022: "I do appreciate the worry over 7 segment displays but cannot over-emphasise that new display technologies are already out that are as cheap or nearly as cheap as 7-segment displays but which are able to display a far greater variety of symbols.

"... I would say the only criteria should be that they:
1. are no more complicated than letters,
2. are easily distinguishable from letters,
3. are easy to write, and
Subjectively, they:
4. are aethetically pleasing to the eye, and
5. just look like numbers"

C. Criteria for Numerals as Implied on the Forum

Table 1 lists many of the numeral-candidates proposed in Topic 11. Each symbol is listed according to the contributor, the time stamp of the post, and a seven-segment display rendition of the symbol. Mr. Greaves' document "Symbols.doc" contains a set of criteria which, coupled with the postings quoted above, serves as the basis for the following criteria for selection of dozenal numerals for digit-ten and digit-eleven.

1. Distinction

It should be easy to read the proposed numeral as a unique symbol, minimizing potential confusion with other symbols in the public lexicon. Candidate numerals that resemble Latin, Greek, or other characters should be avoided. By some, this avoidance extends to such characters in any of their major treatments (handwritten, printed, computer-generated, segmented display).

- Easily distinguishable from English-use letters (Parry, Patterson).
- Avoid Greek letters or mathematical symbols (White, «DoubleG», «Rosie»).
- Multicultural consideration; avoid appearance of nonwestern characters (Ferguson, «DoubleG»).

2. Clarity

Proposed numerals should be robust, to resist confusion by hurried or sloppy handwriting. Preliminary evaluation of possible malformed proposed numerals and test-execution of the proposed numerals can help control their clarity.

- Numerals should be resistant to confusion by sloppy handwriting (Ferguson).
- Seven-segment display numerals should avoid the appearance of regular numerals with "burned out" elements («växan», «Dan»).

3. Ease of Writing

The ideal result seems to be numerals that require at most 2 strokes and don't involve lifting the pen.

- Writable in a minimal number of strokes («finlay», «växan»).
- Quick and easy handwriting (Patterson, «DoubleG», «växan»).
- Are no more complicated than letters (Patterson).

4. Visual Unity

Proposed numerals should work well with the existing decimal numerals [implying Ralph Beard's "Least Change" philosophy, cf. Vol. 1 № 3 pp. Ɛ–11;.].

- New numerals should resemble the Hindu Arabic numerals or "look like" numbers (White, Patterson, «växan»).
- Symbols like the Churchman-proposed { *, # } may be fine in their original application, but don't make acceptable numerals (Ferguson).

5. Minimization of Impact

Some support creation of new numerals which fit existing representational technology, in the spirit of reducing or eliminating resistence to the introduction of a dozenal system.

- Work with seven-segment displays («växan»).
- Don Hammond, Niles Whitten, Ray Greaves, George Jelliss, William Schumuacher, and others have produced numeral sets which mesh well with the seven segment LCD/LED displays.

Table 1. DozensOnline Suggested Numerals

	Source «Username»	Topic Number=11 Timestamp	Digit-ten		Digit-eleven	
			Symb.	Disp.	Symb.	Disp.
1	dsgb [Issac Pitman, DB 03·2·01]		ᒿ	5	Ɛ	ⴶ
2	dsgb [Don Hammond, DB 4Χ·2·13]		ς	⊐	Ƨ	Ł
3	dsa [Kramer-Bell, NR 02·1·11, DB 25·1·02]		*	—	#	—
4	dsa [Dwiggins, DB 01·1·02]		Χ	H	Ɛ	E
5	Bryan Parry [citing the common "T & E"]		T	—	E	E
6	Bryan Parry [citing the use of Dwiggins]		X	—	E	E
7	Bryan Parry (in resonance with "A & B")		Γ	Γ	Э	Ǝ
8	Bryan Parry		β	Ꞵ	Σ	E
9	Bryan Parry ("Δ Λ resembles 'A'")	2005 0802 2056	Δ Λ	Π	Σ	E
Χ					Π	Π
Ɛ	Bryan Parry (analogs to X=10, II=11)		Ж	—	Ꜩ	—
10					И	—
11	«gpj» [George P. Jelliss, DB 36·2·14]	2005 0803 1516	δ	↺	Ɛ	E
12	«genito» [Gene Zirkel, "Bell" numerals]	2005 0803 1603	ϰ	H	ǂ	E
13		2005 0805 1842	Ø	—	Î	
14	«adolfzero»		†	—	‡	—
15			Ç	—	€	—
16	Daniel White	2005 0806 1620	See Section B			
17	Jean Essig [DB 10·2·48, posted by Parry]	2005 0807 1817	ᒿ	—	∠	∟
18	«eap»	2006 0123 0134*	⚹	—		
19	«växan»	2006 0210 0226*	ᴃ	Π	ᴃ	Я
1Χ			Ɔ	Ⴑ		
1Ɛ	«ruthe» [Ray Greaves, DB 4Χ·2·13]	2006 0712 1058	Ⴃ	⊓	⌐	Γ
20	«Dan»	2005 0814 1716	See Section B			

Table 2. Other DozensOnline Symbology Discussions

All topics are accessible from the "On Topic: Number Bases" board. Visit the topics in question by entering the number in the right column after "http://z13.invisionfree.com/DozensOnline/index.php?showtopic=". *This list is not necessarily complete.*

Figure 1. *Daniel White «Twinbee» 2005 0806 1620 posts a graphic containing two dozen two numeral candidates which "look more like the numbers 0 – 9 than most symbols do."*
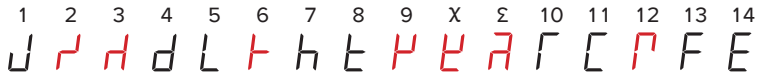

Figure 2. *«Dan» 2005 0814 1716 posts seven-segment configurations which are not identical to the current digits and their variants, but are contiguous and stand the full height of the display. Additionally, the candidates must not differ from the current digits and their variants by one segment. Digits in red are among the two dozen later selected by «Twinbee» (see Figure 3). None of these candidates are considered by «Dan» in his later post as acceptable (see Figure 4).*

Figure 3. *2^7 possible ways to compose seven-segment display-style numeral candidates, as posted by «Dan» 2006 0814 2314. User «Twinbee» 2006 0816 1831 used Mr. Greave's criteria similar to that shown in section C to identify 20; numeral candidates shown in red above, and in Figure 4.*

Figure 4. *«Dan» 2006 0817 0513 examines the Twinbee selection, deeming only two shown in red as acceptable, and four as "awkward to write".*

Figure 5. *«Twinbee» 2006 0830 0042 posts his favorite nine candidates; the two red candidates are deemed by Mr. Ferguson at 2006 0830 1358 as his selection out of this group. Note that 'E' is selected in violation of the section C criteria.*

Figure 6. *A selection of other symbols discussed in the thread. The "Elder Futhark éðel/ethel" rune, and its rounded and inverted variants, and various ways of writing "X" in one stroke.*

D. Further Seven Segment Evaluations.

A contingent of supporters of a strong criterion 5 test and some simply interested in discussing the problem examined the permutations of a seven-segment display character to determine which of these configurations were acceptable. User «Dan» initially posted one dozen four configurations (see Figure 2). Seven of these were among two dozen configurations Mr. White selected in response to Dan's posting all Χ8; possible configurations (see Figure 3). Mr. White, as «Twinbee», added "The missing two characters for dozenal are in there somewhere!" after having identified the two dozen symbols in Figure 4. Mr. Greaves requested comments, directing someone to screen the Twinbee candidates against his criteria, similar to section C. User «Dan» responded by evaluating each of Mr. White's choices given Greaves' criteria, narrowing the Twinbee candidates to the two shown in red in Figure 4 (See Figure 7, inadvertently skipping number 15 {Ɫ}). The discussion of seven segment candidates moved away from criteria and back to preferences soon afterward. Mr. White posted his favorite configurations, from which Mr. Ferguson identified two as favorite. Discussion began to consider pixilated displays and moved away from exclusively considering seven-segment configurations. ⣿

Figure 7. *Evaluation of symbols in Figure 4 by user «Dan» at 2006 0817 0513:*

0) Ⱶ Looks like '+'.
1) ㇄ Looks like '4'.
2) ㇄ Looks like a broken '5'.
3) ⌐ᒷ Could possibly be confused with '2' or 'Z'.
4) ⼁ Awkward to write.
5) ⌐ᒷ Looks like a broken '2' or a Spanish '¿'.
6) Ⴑ Awkward to write.
7) ⼁ Looks like '+'.
8) ⼁ Awkward to write.
9) ⌐ Looks like 'J'.
Χ) ⼁ Requires lifting the pen but is otherwise fine.

Ɛ) Ⱶ Requires lifting the pen and could be confused with for-all symbol.
10) Γ Looks like Gamma.
11) Ⱶ Looks like 'h'.
12) Ⳑ Looks like 'C'.
13) ⌐ᒷ Looks like '?' or a broken '2'.
14) Γ Looks like Gamma.
16) ⼁ Requires lifting the pen but is otherwise fine.
17) ⼁ Awkward to write.
18) ⌐ Looks like '7' or ')'.
19) ⌐ Looks like a broken '9' or '0'.
1Χ) ⌐ Looks like ')'.
1Ɛ) ⼁ Looks like 'a' or 'ə'.

Find the base, *b*, used in each of the following.
Hints: Each equation is written in its base, *b*. For example
$47 = 4b + 7$ and $b > 7$. The base of a logarithm is an integer > 1.

1.) $\text{Log}_b 24 - \text{Log}_b 3 = \text{Log}_b 8$

2.) $2\,\text{Log}_b 5 = \text{Log}_b 31$

3.) $\text{Log}_b 4 + \text{Log}_b 30 = \text{Log}_b 100$

4.) $\text{Log}_b 100{,}000 = 101$

5.) $-\text{Log}_b 100 = -2$

6.) $\text{Log}_b 5 = -2$