Daniel's Ethiopic Number Algorithm #4
by Daniel Yacob

For one reason or another during the last four years, it seems necessary that each year I write a new number algorithm for converting Arabic numbers into Ethiopic. Usually this happens as a memory test that fails and then a new algorithm is created and new insight gained. This year, I was finally getting around to HTML-ing last year's algorithm but couldn't find it! I tried to rediscover it from some computer code but ended up inventing yet another algorithm.

I think this one is pretty simple, I've tried to emphasize that in the presentation below. The key is that numbers are read in groups of 2 and each group gets the same conversion process. There is only a single special rule that is discussed at the end:

1)	7,654,321				Start with an arbitrary number.
2)	[07]	[65]	[43]	[21]	From left to right group numbers in sets of 2.
3)	$[07]_3$	$[65]_2$	$[43]_1$	$[21]_0$	We'll add subscripts for book keeping.
4)	$[07]_3$	$[60+5]_2$	$[40+3]_1$	$[20+1]_0$	Now expand the sets into 10's and 1's.
5)	$([7])_3$	$([60][5])_2$	$([40][3])_1$	$([20][1])_0$	Write expansions as separate numbers.
6)	$(፯)_3$	$(፷፭)_2$	$(፵፫)_1$	$(፳፩)_0$	Go ahead and convert to Ethiopic numbers.
7)	$(፯) + (3 × \{፻\})$	$(፷፭) + (2 * \{፻\})$	$(፵፫) + (1 * \{፻\})$	$(፳፩) + (0 * \{፻\})$	The subscripts now tell how many ፻'s we need.
8)	$(፯) + (፻+፻+፻)$	$(፷፭) + (፻+፻)$	$(፵፫) + (፻)$	$(፳፩) + (0)$	
9)	$(፯) + (፻+፼)$	$(፷፭) + (፼)$	$(፵፫) + (፻)$	$(፳፩) + (0)$	Reduce as per $፼ = ፻ + ፻$
10)	፯፻፼	፷፭፼	፵፫፻	፳፩	Group…
11)	፯፻፼፷፭፼፵፫፻፳፩				Collect and we're done!

Note! Except for when we use subscript "0" (the far-right side) there is a rule that 1's in the 1's place are absorbed by an ፲, ፻, or ፼ on the right. So, if we changed the "5" in $[65]_2$ to a "1" in the above; the reduction would go as:

3)	$[07]_3$	$[61]_2$	$[43]_1$	$[21]_0$	We'll add subscripts for book keeping.
:	:	:	:	:	:
9)	$(፯) + (፻+፼)$	$(፷) + (፼)$	$(፵፫) + (፻)$	$(፳፩) + (0)$	Reduce as per $፼ = ፻ + ፻$
10)	፯፻፼	፷፼	፵፫፻	፳፩	Group…

The interesting consequence then is that ፩ can ***only*** appear in the one's place (the far right)!

Author's Note

This article is the 3rd in a series of numeral algorithms developed and published over several years. While the algorithm presented is believed to be valid, the paper should be considered as having been superseded by later papers, and ultimately the final paper: *A Look at Ethiopic Numerals*.

The complete numeral algorithm series:

- 1994, *Another View of Ethiopic Number Sequences*, originally posted to the "EthioSciences" email list of the EthioList mail server. Then later published as a web page under the Abyssinia Cyberspace Gateway: http://abyssiniagateway.net/fidel/EthNumbers.html , at Academia.edu https://www.academia.edu/127879191/Another_View_of_Ethiopic_Number_Sequences

- 1995, *Altered Perspectives and Insight to Algorithm – an Illustration of the Glyph Arithmetic Development of Ethiopic Numbers,* Abyssinia Cyberspace Gateway, http://abyssiniagateway.net/fidel/Enums.html , at Academia.edu https://www.academia.edu/127879201/Altered_Perspectives_and_Insight_to_Algorithm_an_Illustration_of_the_Glyph_Arithmetic_Development_of_Ethiopic_Numbers

- 1997, *Daniel's Ethiopic Number Algorithm #4,* Abyssinia Cyberspace Gateway, http://abyssiniagateway.net/fidel/EthNumbers97.html , at Academia.edu https://www.academia.edu/127879205/Daniel_s_Ethiopic_Number_Algorithm_4

- 2000, *A Look at Ethiopic Numerals*, 2000, https://www.geez.org/Numerals/, Geez.Org. A form of this article was published under the title *"Conversion and Formatting of Ethiopic Numerals"*, in Multilingual Magazine, November, 2000. At Academia.edu https://www.academia.edu/127115901/A_Look_at_Ethiopic_Numerals